The Mining Journal
Established 1835 — Railway & Commercial Gazette

Vol. CCXLIII No. 6214 — LONDON, SEPTEMBER 24, 1954 — PRICE 8d.

Cable Belt Conveyor handling 300 tons per hour run of mine coal. Length of conveyor 1,800 yards. Lift 600 ft.

Economic long distance material handling using a

CABLE BELT CONVEYOR

Economies effected are

CAPITAL COST. Initial cost usually lower than comparable conveyor installations.

BELT COST. Initial cost is low—belt wear is negligible—edge wear eliminated.

MANPOWER SAVING. Eliminates tandem point attendants, tub handlers, etc. and reduces number of men for cleaning up spillage.

SPILLAGE. Due to steadiness of system, spillage is negligible.

MAINTENANCE. Ropes supporting pulleys are pitched at approx. 20ft. intervals thereby greatly reducing lubrication. One C.B.C. replaces a series of conventional belt conveyors. This means maintenance of only one Driving Unit and Tail End Unit.

POWER. Considerably less power required than for normal conveyor system.

DEGRADATION OF MATERIAL. Absence of tandem points reduces material degradation.

APPLICATIONS. The need to install conveyors in series is eliminated since much longer distances and higher lifts are now possible in one stage.

FIRE RISK. The special construction greatly reduces fire risk.

LET US SOLVE YOUR TRANSPORT PROBLEMS

CABLE BELT LIMITED

ROSE STREET, INVERNESS

Telephone: Inverness 62 — Telegrams: Cablebelt, Inverness

CHALLENGERS *in name* CHALLENGERS *in performance*

THREE YEARS AGO, the first British Challenger went into action. Today, Challengers are firmly established as leaders in the field of earth-moving. Tough Challenger tractors are now at work in over fifty countries throughout the world, helping to grow more food, to make new roads and railways, to build up new industries, and to make permanent friends for Britain. There is a Challenger for every job—Challenger 1, 50 b.h.p., Challenger 3, 95 b.h.p., and Challenger 4, 150 b.p.h.; all can be supplied with matched ancillary equipment. Because of their proved record for reliability and service, more and more crawler tractor operators at home and abroad are changing to Challengers. And with good reason — because Challengers have demonstrated that, under really arduous conditions, they can do more work, do it faster, and keep on doing it.

AFTER-SALES SERVICE

Wherever a machine is sold, spares are readily available, backed by a world-wide service organisation.

FOWLER (LEEDS) Challenger British Diesel Crawlers

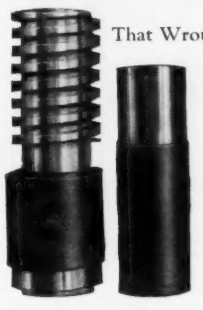
John Fowler & Co. (Leeds) Ltd., Leeds, 10

PRODUCTS OF THE MARSHALL ORGANISATION, GAINSBOROUGH, ENGLAND

Concessionaires for Great Britain: Thos. W. Ward, Ltd., Albion Works, Sheffield, 4

You can trust Wrought Iron to take the strain

Danger does not always reveal itself as unmistakably as this. Human lives may be endangered in many invisible ways. They are, for instance, at the mercy of the behaviour under strain of such things as couplings, cable chains and cage and lifting gear. *For equipment of this kind, with its responsibility, Wrought Iron should always be specified.*



That Wrought Iron has outstanding machining properties is strikingly demonstrated by these typical test pieces. Its ductility is equally notable, while its essentially fibrous character gives it a toughness which enables it to stand up to severe vibrations, absorb varying stresses and recover from sudden shock.

Unrivalled in its ability to withstand shock and overstrain, Wrought Iron is renowned for its rust-resisting properties. Its natural susceptibility to welding is enhanced by slag inclusions; it is safer and more economical than mild steel for many long-term purposes — especially out-of-doors or under wet conditions.

Wrought Iron in strips and bars and in a variety of sections is produced at the Midland Iron Works for innumerable uses. A free copy of our Section Book will be sent on request, while our technical representative will be glad to advise you on any aspect of Wrought Iron usage.

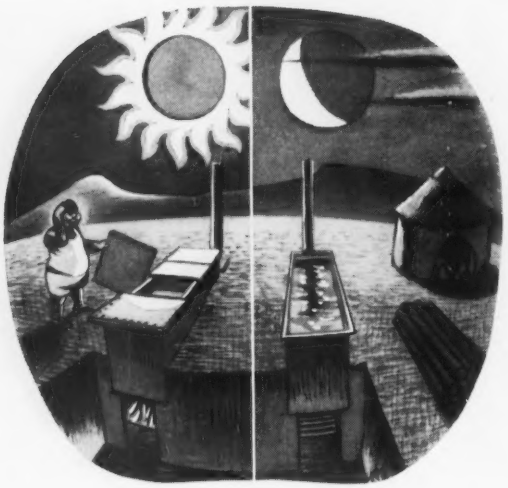
The Midland Iron Co. Ltd

MIDLAND IRON WORKS · ROTHERHAM

MI/9

. . . you can safely use Wrought Iron for a host of purposes

Hot & Cold



Open Tank method of

MINING TIMBER PRESERVATION

Where the limited throughput of timber does not warrant the erection of a Vacuum/Pressure impregnation plant, a Hot and Cold Open Tank unit proves to be a very good second best. Our Brochure 120 (free) describes in details how to construct and operate a Hot and Cold plant for use with "Tanalith" preservative.

'Tanalith'

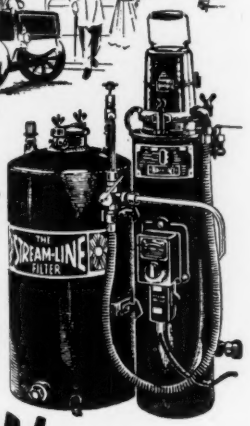
This wood preservative is ideally suited to Hot and Cold plant use, since it presents no sludging problems and introduces no fire hazard. It is clean, non-oily and safe to handle. Please write for details to:—

HICKSON'S TIMBER IMPREGNATION CO. (G.B.) LTD.
Export Sales Office: 36 VICTORIA STREET, LONDON, S.W.1.
Cables: 'Roseine, London.'
Branches in :
SOUTH AFRICA, WEST AND EAST AFRICA, CENTRAL AFRICA, NEW ZEALAND, AUSTRALIA, MALAYA, TURKEY

L.G.O.C. Bus, Orion type, 1904

The Motorbus created a problem...

The Motorbus faced its operators with the problem of maintaining maximum efficiency at minimum cost. Today Streamline Filters provide an answer by enabling first grade oil to be used over and over again. Already 40,000 users are proving the value of Streamline Filters in the trouble-free operation of road transport.

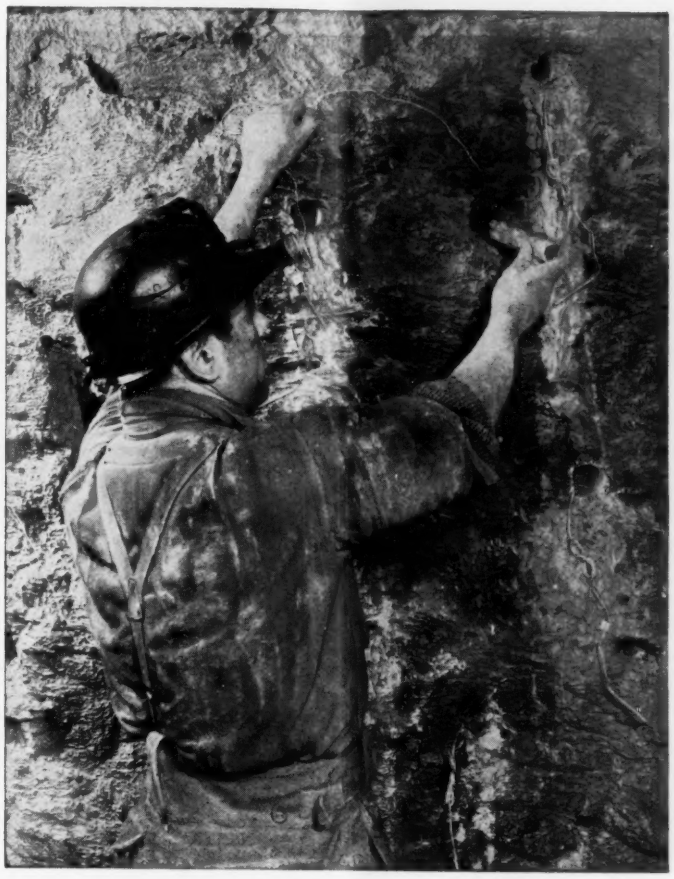


Streamline
FILTERS PROVIDE THE ANSWER
INGATE PLACE, LONDON, S.W.8 'PHONE: MACAULAY 1011

WOLVERHAMPTON DIAMOND DIE & TOOL Co. Ltd.

BOARTS and INDUSTRIAL DIAMONDS Exporters

11 HATTON GARDEN, LONDON, E.C.1.
Telephone: HOLborn 3017 *Cables:* Pardimon, London



'NOBEL-GLASGOW' Explosives and Accessories

There is a 'Nobel-Glasgow' explosive for every blasting operation.

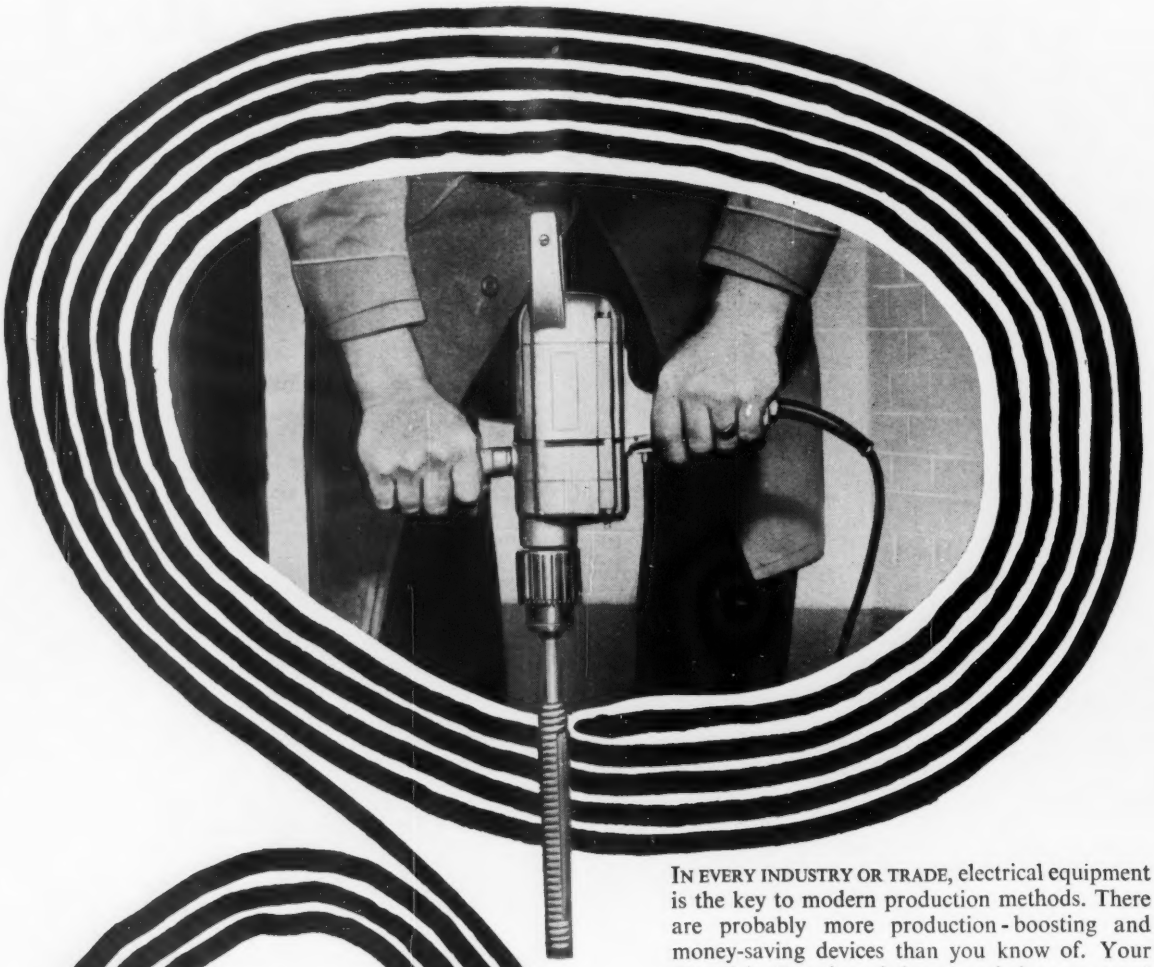
Users are invited to apply to the Nobel Division of Imperial Chemical Industries Limited for assistance with their problems.

IMPERIAL CHEMICAL INDUSTRIES LIMITED
NOBEL DIVISION, 25 BOTHWELL STREET, GLASGOW, C.2

ICI

N.44

Having a hand in Productivity



Drilling for—Rag Bolts!

It sounds strange. But most of us have seen a rag bolt even if we haven't recognised it. Machinery on a concrete floor, bolted down. The bolts embedded in the concrete are rag bolts. In the old days it was a case of a man with hammer and chisel—laboriously and slowly chipping the concrete until the holes were large enough and deep enough. Now one man takes an electric drill, and drills *the holes; just like that. (Productivity!) Faster? Fifty times—a hundred! But the electric drill is ONLY ONE OF THE MANY AIDS TO PRODUCTIVITY THAT ELECTRICITY CAN BRING YOU.*

IN EVERY INDUSTRY OR TRADE, electrical equipment is the key to modern production methods. There are probably more production-boosting and money-saving devices than you know of. Your Electricity Board can help you and give you sound advice.

They can also make available to you, on free loan, several films on the uses of electricity in Industry—produced by the Electrical Development Association.

E.D.A. are publishing a series of books on "Electricity and Productivity". Four titles are available at the moment; they deal with Higher Production, Lighting, Materials Handling, and Resistance Heating. The books are 8/6 each (9/- post free) and the Electricity Boards (or E.D.A. themselves) can supply you.

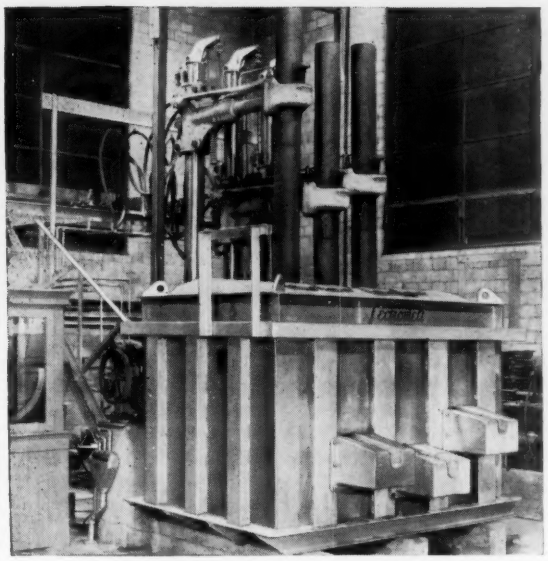
The British Electrical Development Association
2 Savoy Hill, London, W.C.2.

Electricity a Power of Good for PRODUCTIVITY

BIRLEC

SMELTING

EQUIPMENT



A pilot plant for smelting.

A Birlec Lectromelt laboratory smelting furnace.

Pilot or Production Plant

Equipment has been supplied or is in course of manufacture for the following applications:—

Production of ferro-silicon, ferro-manganese, ferro-chromium etc.
Reduction of phosphorus, iron, nickel, cobalt and other oxides.
Matte and speiss melting.
Melting fused silica and other non-metallics.
Calcium carbide production.
Refining of non-ferrous metals such as copper.

Please send for catalogues No. 55 and 104P.

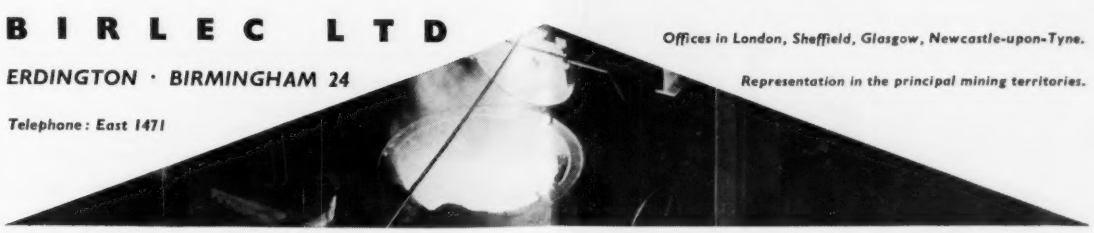
BIRLEC LTD

ERDINGTON · BIRMINGHAM 24

Telephone: East 1471

Offices in London, Sheffield, Glasgow, Newcastle-upon-Tyne.

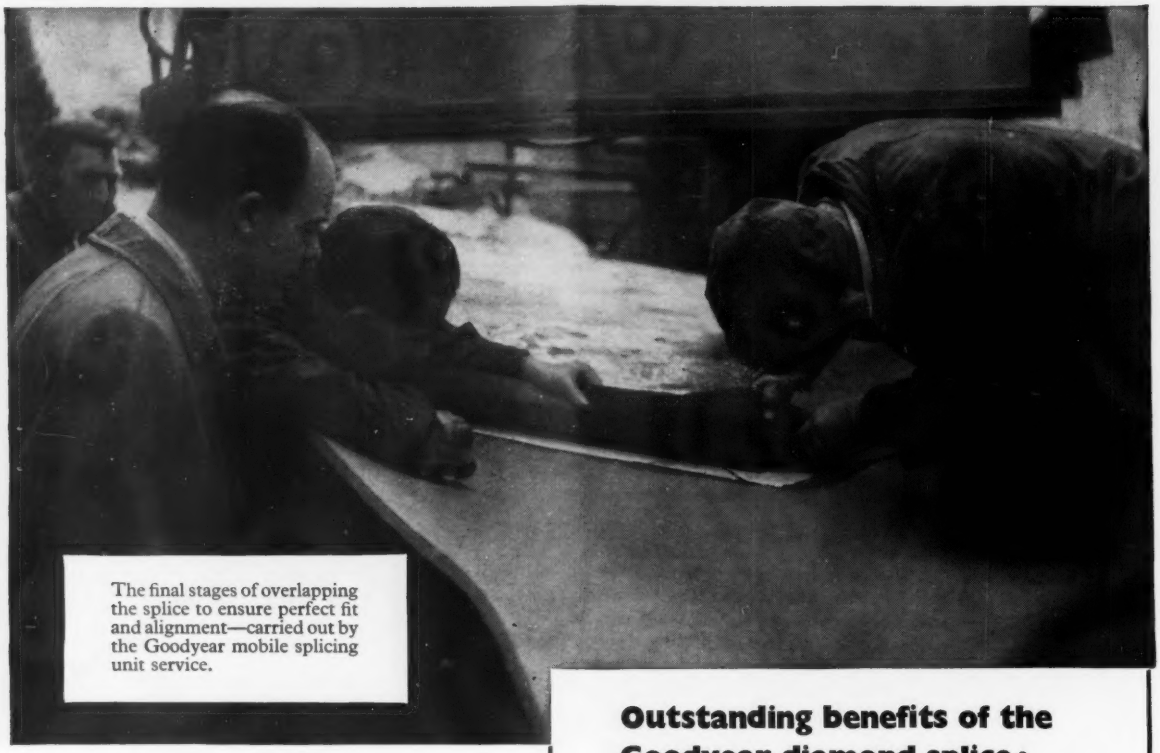
Representation in the principal mining territories.



sm/B. 2244. 54.

DIAMOND SPLICING MOST USED METHOD

—GIVES STRONGEST JOINT



The final stages of overlapping the splice to ensure perfect fit and alignment—carried out by the Goodyear mobile splicing unit service.

DIAMOND SPLICED **GOODYEAR** BELTING

The diamond splice, developed by Goodyear, is recognised as the most satisfactory method of joining conveyor belting yet devised. It has established an undeniable superiority over other methods of splicing.

Installing a Goodyear conveyor belt, made virtually endless by the Goodyear Diamond Splice, is the surest way of lowering the cost per ton. To back up their recommendation of splicing, Goodyear operate a mobile splicing unit. This service is staffed by a team of craftsmen, equipped to carry out on-the-spot splicing anywhere. Furthermore, specialists—each familiar with the problems of a particular branch of industry—are available at Wolverhampton to assist or advise you in the choice, installation, maintenance or repair of Goodyear Industrial Rubber Products. For further information write direct to Dept. D.7, The Goodyear Tyre & Rubber Co. (G.B.) Ltd., Wolverhampton.

Outstanding benefits of the Goodyear diamond splice:

1 *Complete freedom from tearing or pulling out.*
2 *No gaps through which to spill fines.*
3 *There is no tendency for the ends to drift while vulcanizing the joint; the belt is in perfect alignment.*
4 *At any cross section through the splice, only a small part of a single ply is lost to tension, resulting in high joint efficiency.*
5 *Greater strength at the joint frequently makes it possible to reduce the number of plies, increasing the flexibility of the belt and reducing its cost.*
6 *The Goodyear method ensures even distribution of tension at the belt ends, which is much more important than the strength of the splice in straight tension.*
7 *The diamond splice gives a smooth joint, with no impact on pulleys, idlers and scraping devices.*
8 *Fastener bending stresses are avoided, and the belt wraps the pulleys as closely at the splice as at any other point.*
9 *Heat deterioration of the belt, due to fasteners, is eliminated.*

GOODYEAR

INDUSTRIAL RUBBER PRODUCTS

CONVEYOR BELTING · V-BELTS · TRANSMISSION BELTING · INDUSTRIAL HOSE

The Mining Journal

Established 1835

Vol. CCXLIII No. 6214 LONDON, SEPTEMBER 24, 1954 PRICE 8d.

CONTENTS

Notes and Comments	339	Technical Briefs	347
From Our Western United States Correspondent	341	Reviews	347
Filtration and Drying Methods in Wet Metallurgical Processes	342	Metals, Minerals and Alloys	348
Increased Uranium Prospecting Activities in Australia	344	The Mining Markets	350
Relationship of Roof Bolting to Safety in Iron Ore Mines	345	Company News and Views	351
Portugal's Mineral Exports	346	Company Meeting	352
Correspondence	346	Nigerian Electricity Supply Corporation Limited	

Published by The Mining Journal Ltd., at 15 Wilson Street, Moorgate, London, E.C.2. MONarch 2567 Subscription £2 per annum

NOTES AND COMMENTS

Tin Control a Step Nearer

The Interim Committee of the International Tin Council held a further meeting in London on Monday and Tuesday of this week, as a result of which recommendations regarding the Council's chief executive appointments have been agreed on for submission to the first meeting of the Council itself, which, subject to formal ratifications of the Agreement, is now expected to be held around the end of this year.

Mr. Georges Peter, of France, has been proposed as the first chairman of the Council. It will be remembered that he presided at the World Tin Conferences held in Geneva in 1950 and 1953. This appointment will, no doubt, come as something of a surprise to those who had expected that the chairmanship would be offered to some personality independent alike of producer and consumer interests. It will presumably fall to the chairman to take all important and big decisions in between meetings of the Council itself, as this body is bound, by its nature, to be intermittent in its operation. The importance of a neutral chairman is therefore apparent.

Nevertheless, whatever may have been the reasons for deciding against such an appointment, there can be no doubt of the Interim Committee's wisdom in proposing the appointment of the representative of a consumer member rather than of a producer member country. Whether deservedly or not, the machinery of pre-war tin control undoubtedly suffered the stigma of being labelled a producers' ring and the fact that we have as the first nominated chairman a representative of France, which has been one of the most vocal of the consumer countries during the formative stages of the new Tin Agreement, should provide an added assurance to consumer members that their interests shall not go by default.

It may be taken as certain that the offices of the Tin Council will be located in London so that the buffer stock manager may be in direct contact with the London Metal Exchange through which medium it may be assumed that most of his operations will be carried out.

In this connection, it is significant that Mr. W. K. Davey, formerly chairman of the Committee of the London Metal Exchange, is to be recommended to the Tin Council for appointment as Buffer Stock Manager, with Mr. J. M. E. Lochtenberg (formerly of the Banka Tin organization) as his deputy. The intimate knowledge of the machinery of the Metal Exchange and of the tin market which these nominations imply, will ensure the necessary technical know-how and market instinct in the operation of the Tin Agreement, which we have seen to be so significantly lacking in some of the large governmental tin operations since the war.

Continuity between the work of the present International Tin Study Group and that of the new Council, to whom the Tin Study Group's functions will be transferred, has been ensured by the nomination of Mr. W. Fox, at present Secretary General of the Tin Study Group, as Secretary of the Tin Council. This is perhaps an appropriate moment to record that it has been under his direction that the Tin Study Group has maintained what has so far not been achieved for any other metal, namely, the publication of complete and *up-to-date* world production and consumption statistics. The measure of this achievement is, of course, relative rather than absolute, but the fact remains that without this sound statistical background, there would have been no firm foundation upon which to build the Tin Agreement.

It would seem that with the Administration of the Tin Council becoming a reality by the end of this year, there will be ample time for the gradual introduction of the quota mechanism. If, as present statistics suggest, the gap between production and real consumption is of the order of 20,000 tons a year, this surplus will in any event not begin to come on the market until the present U.S. contracts with Bolivia and Indonesia run out in the early months of next year. At that point, the International Tin Council will presumably begin to build up the buffer stock towards the 10,000 tons level at which restrictions of production begins to operate under the Agreement. It may well take six to nine months from next January for this tonnage to be accumulated without embarrassing the market, so that producers seem unlikely to be called upon to make their first cut in production before the third quarter of next year.

Incidentally, it is still a matter for speculation as to how far producer countries will fulfil their obligations to the buffer stock in cash and how far in metal. So far as we

know, the only restriction imposed by the Agreement is that not more than 75 per cent of a producers' contribution may be in metal. Whether or not producers elect to contribute as much metal as this would seem to depend upon the basis on which the cash equivalent of the metal contribution is to be assessed. That is to say that the producers' contribution to the buffer stock is essentially visualized as a tonnage contribution and we have not yet heard of any metal-cash equivalent having been agreed upon. The significance of this becomes apparent if it is assumed that it is decided that cash will be acceptable in lieu of metal on the basis of the floor price of £640. If this were to be so, we would presumably find producers making their full contribution in cash while continuing to obtain the considerably higher current market price for their tin. Some clarification of the metal-cash exchange rate thus appears to be a matter of some urgency.

B.I.C.C.'s New Stake in Copperbelt

The means of financing the new electrolytic copper refinery which, it was announced last March, is to be built at N'dola has now been made clear. Originally it was thought that Roan Antelope would take up the Ordinary capital of N'dola Copper Refineries and would secure the remainder of the finance through outside loan capital. In fact, the whole of the capital will be in equity, £2,000,000 being provided by Roan Antelope and £1,000,000 by British Insulated Callender's Cables. It has been suggested that the fact that Roan Antelope already has £1,000,000 of loan stock has made it preferable to avoid a further large amount of loan stock in N'dola Copper Refineries. Shares will be issued at par as and when finance is required and the capital of N'dola Copper Refineries will be raised from its present £100 to £3,000,000.

British Insulated Callender's Cables is an important customer of Roan Antelope and the latest move seems to have everything in its favour. Initially, the refinery will refine Roan Antelope's output of blister copper (this fact determined the siting of the plant) which in the year up to June 30 last year was 88,678 tons. With a planned capacity of 55,000 to 60,000 tons of electrolytic copper the refinery will not immediately absorb all the Roan output. But an ultimate capacity of 110,000 tons of electrolytic would be ample to handle Roan's output and also that of smaller mines as well. All that is some way in the future. All that can be said at the present is that B.I.C.C. appears to have made a shrewd and profitable investment. At the same time, it is difficult not to reflect on the comparative states of the industry in Rhodesia and Chile and the ease with which capital can be raised for the one and the uncertainty of securing a return on it in the other. If a satisfactory solution can be found to the problem of employing white and coloured labour side by side in Rhodesia, the future of the copper industry appears to be extremely bright.

French Ore Mining and Metallurgical Features in 1953

The annual report of the Federation of syndicated chambers of ores and crude metals in France last year, recently published, exhibits a very cautious, if not actually despondent tone: 1953 it observes was marked by very severe difficulties for most branches of the mining industry. The effect of the fall in world prices was aggravated in the case of French producers by exchange depreciations. However, despite these unfavourable conditions, most of the big schemes of equipment and development in hand were continued, especially those in French North Africa and overseas.

In the main, the minerals of large scale production—iron, manganese, lead, zinc and bauxite—showed some increase in output. Elsewhere, declines were general, culminating in suspension of operations in some cases.

Iron ore output increased to around 5,000,000 tonnes, of which Algeria contributed 3,400,000 tonnes. Conakry, which commenced production early in the year, produced 400,000 tonnes which was exported mainly to the U.K. and Belgium. The Ouenza mine, the chief French North African producer, practically completed its five-year mechanization programme; the iron mines of Mauritania continued its examination of the Fort Gouraud property and made surveys of a railway line to export ore through Villa Cisneros.

In the south of French Equatorial Africa the Ogoué company was engaged on examining the manganese deposits and deciding on methods of shipping the ores from Franceville to the coast.

Despite lower prices and cautionary curtailment of exploratory and development work the output of lead in French North Africa rose to 187,000 tonnes (185,000 in 1952), and of zinc to 129,000 tonnes (114,000 in 1952). The year witnessed important developments in the treatment of zinc concentrates: at Aouli a sink and float plant, using galena as the heavy medium, was installed. The Pênarroya and Zellidia companies worked on the flotation of calamine concentrates and were proceeding to the problem of the direct production of the oxides from material previously concentrated. At Auby half a battery of New Jersey type of vertical crucibles was installed.

Copper occurrences continued to be the subject of research, the Akjoujt deposit in Mauretania—a major project—being examined with a view of commencing work and plans for Cavallo in Algeria are being made.

Production of tungsten ores in Metropolitan France improved in spite of decline in prices and totalled 1,030 tonnes of ore last year.

As regards cobalt, reorganization of the Bou Azzer mine in Morocco was continued and the output was back to the pre-1952 level of about 6,000 tonnes a year.

Modernization of the New Caledonia nickel industry is a major task calling for improvements in the treatment of the garnierite ores, which should result, after a certain period, in reducing returning charges to a competitive level. Until this result is achieved, some financial solution must be devised to enable European consumers to purchase at the world price, otherwise no Caledonian metal will be exported.

Graphite production encountered serious marketing difficulties last year and production fell from 18,000 tonnes to 13,500 tonnes.

Diamond output from French Africa, shipped entirely to foreign markets, was 320,000 cts., the contribution of French West Africa being higher and that from French Equatorial Africa lower.

More Light on U.S. Stockpiling Plans

In a statement issued this week in Washington by Mr. Flemming, the Director of Defence Mobilization, it is revealed that the G.S.A. has now received revised stockpile purchasing directives, which go someway, but not very far, towards clarifying the Administration's stockpiling intentions.

Altogether $900,000,000 have been budgeted for stockpile operations in the current fiscal year. $400,000,000 of this will, however, be devoted, not to the purchasing of new materials, but to transferring to the stockpile account materials acquired in past years under the D.P.A. act. $145,000,000 are to be spent on normal stockpile operations during the current year while in addition an undisclosed

amount will be spent on additional purchases of new materials for the long-term stockpile programme initiated last month (see *Mining Journal*, August 27, p. 233).

In addition to cash purchases, the G.S.A. has been given two lists of materials it may acquire from foreign countries through barter transactions against surplus farm commodities. Of these, one list concerns materials which may be acquired through direct barter deals, while the second list is of materials purchased with foreign currencies, acquired from the sale of surplus commodities.

The following are the metals listed for purchase in each of the above categories (other materials than metals also appear in these lists but are not mentioned here):

$400,000,000 to be spent on transfer to stockpile account from D.P.A.: aluminium, chrysotile, asbestos, beryl, metallurgical chromite, cobalt, copper, block mica, molybdenum, nickel and tantalite.

$145,000,000 to be spent on new materials: aluminium, amosite asbestos, chrysotile asbestos, Jamaica bauxite, beryl, refractory chromite, diamond boart, metallurgical fluorspar, battery manganese ore, chemical manganese ore, block mica, film mica, nickel, platinum, selenium, talc, tantalite, rare earths and tungsten.

Undisclosed volume of purchases for long-term stockpile: lead, metallurgical manganese, tin and zinc.

Metals to be acquired through direct barter: aluminium, amosite asbestos, chrysotile asbestos, metallurgical, bauxite, beryl, chromite, copper, diamond boart, industrial diamonds, amorphous graphite, lubricant graphite, chemical manganese ore, block mica, film mica, platinum, selenium, talc and titanium.

Metals to be acquired with counterpart funds from surplus farm commodity sales: antimony, metallurgical and refractory bauxite, beryl, bismuth, cadmium, chromite, cobalt, acid grade fluorspar, lead, magnesium, chemical and metallurgical manganese ore, mercury, mica splittings, nickel, platinum, palladium, selenium, tantalite, titanium, tin and zinc.

Western United States

(From Our Own Correspondent)

Portland, Oregon, August 25.

Among new uranium producers are some of the large oil companies, Pennsylvania Coal and Coke, Lehigh Valley Coal, New Jersey Zinc, Idaho Maryland Gold and a host of lesser companies. Mr. Blair Burwell, president of Mineraus Exploration Co. and an outstanding authority on uranium development, expressed the opinion that if the present intensive activity in the Colorado Plateau region keeps up it will enable the United States to maintain the lead in nuclear and atomic development by assuring an ample and continuous source of raw material for an indefinite period.

Rico Argentine Mining Co. has announced that it will erect a plant at its mine at Rico, Colorado, for the manufacture of sulphuric acid for the uranium mills of the Colorado Plateau. Rico Argentine ores are lead-zinc sulphides with considerable pyrite. It is estimated that 15,000,000 tons of pyrite are available of which 200,000 tons are quickly available by retreatment of tailings. The plant is designed for a daily output of 200 tons of acid.

Anaconda's new plant at Bluewater, New Mexico, first to be designed and built to use a carbonate leaching process for treatment of uranium ores, has been in successful operation for some time. The process was developed by Anaconda metallurgists to treat the limestone ores of this district because it was found that an acid process, while effective from the standpoint of recovery, was too expensive for these ores, whose calcium carbonate content runs as high as 95 per cent, and also because the capital required was less than for the usual type of leaching plant.

Very briefly described, the ground and sized ore is leached with sodium carbonate and bicarbonate, producing a pregnant solution in which the uranium is contained as water soluble sodium uranyl tricarbonate. This pregnant solution is treated with an excess of sodium hydroxide which precipitates the uranium in the form of sodium diuranate. After filtering, the precipitate is dried and shipped to an AEC materials preparation plant. Obviously, very close control is very necessary at all stages of the process. Anaconda plans another mill in this locality for treatment of the sandstone ores of the area by acid leaching.

POLITICS AND SELF-SUFFICIENCY

The Malone Committee has submitted a voluminous report after 10 months of hearings to determine "the accessibility of the critical raw materials to the United States during wartime" and to recommend methods of encouraging the production of such materials, both to meet expanding economy and to promote security. Critics of the report will be sure to characterize it as "isolationist." Among other things it recommends abandonment of the Reciprocal Trade Programme, abolishment of international control of critical minerals and a mineral policy based on Western Hemisphere self-sufficiency. The previous mineral policy of the State Department is criticized as working to the detriment of domestic industries in the production of strategic war materials. In strictly domestic matters recommendations include increased depletion allowances, accelerated stockpiling, modification of S.E.C. control over mining securities, a five year programme of research and a titanium production goal of 150,000 tons annually. The recommendations on depletion were included in the recently enacted tax revision bill.

THE BASE METALS INDUSTRY

On August 7 production started at Phelps Dodge Lavender Pit near Bisbee, Arizona, marking the largest of three major open pit operations to be put on production during the past year. Last November, Anaconda's Yerington mine commenced with a rated annual output of 33,000 tons and in May A.S. and R. followed with Silver Bell, rated 18,000 tons. Lavender's immediate production will be at the rate of 30,000 tons but before the end of the year additional facilities for leaching lower grade ores will bring output to 38,000 tons. The ore body is estimated to contain 41,000,000 tons of sulphide ore averaging 1.14 per cent copper and 31,000,000 tons averaging 0.42 per cent. Ultimate preparation involves stripping of 70,000,000 tons of overburden, of which 45,000,000 tons have been removed already. The pit is nearly three-quarters of a mile long and will be worked to a depth of 900 ft. Productive life is estimated at 12 years.

Sunshine Mining Co., in the Coeur d'Alene district, leading silver producer in the country, also led the country in antimony production in 1953. Much of Sunshine's ore is tetrahedrite and with the revision of its flowsheet (*Mining Journal*, January 22, 1954) the antimony is captured in a silver-copper concentrate from which it is recovered by leaching.

Illinois Zinc Co. is re-opening two of its mines in Arizona, the Kearney, near Silver City, and the Shannon, near Tombstone. The former was producing at the rate of 500 tons of refined zinc per month when it was closed down.

Filtration and Drying Methods in Wet Metallurgical Processes

By C. C. DOWNIE

The recovery of precipitates and residual materials by various wet extraction processes is not always a paying proposition due largely to the fact that recovery methods in many cases extend only to the use of the ordinary filter press rather than to recovery methods utilizing the latest vacuum filters and vacuum dryers. In the following article, the filtering arrangements used are described, as are different types of filters. Similar details are given of the filtration and drying activities in the metallurgical field encompassing the drying of precipitates and crystals and rotary vacuum dryers.

The dewatering and drying of residual material from various wet extraction processes is not infrequently carried out in a more crude and haphazard manner generally than in the chemical factory, where the more costly types of precipitates justify greater expenditure on efficient chemical engineering equipment. Whereas the extraction of gold by the cyanide and other systems, and the recovery of precious and rare metals makes this a paying proposition, precipitates and residual materials from wet treatment of the heavy metals are not so well placed and, incidentally, often accumulate in large tonnages.

Briefly, a survey of six copper wet extraction processes revealed that the precipitated metal was simply washed by decantation, the sludge riddled to free it from pieces of metallic iron, drained, and placed directly on extensive open steam-heated dryers. One of the earlier wet nickel systems persisted in filtering the limed precipitates in large wooden filter-presses, as was also followed in the cobalt process. Although selenium and tellurium recovery methods in the U.S.A. utilize the latest vacuum filters and vacuum dryers, the same cannot be said of practice here, which, at least until quite recently, used the ordinary filter-press.

The low market price of lead for many years prevented any extension of wet extraction systems, but a unique method, taking advantage of the high specific gravity of lead sludges, comprised simply running the wet mass over an open wood framework covered with filter cloth. The great weight of the mass caused the surplus water to be exuded sufficiently to allow it to be placed in the dryers within a matter of a few hours, thereby saving the cost of filtering equipment, which would otherwise have been elaborate.

FILTERING ARRANGEMENTS USED

Filter aids, which have been widely developed in chemical engineering practice, appear to be only infrequently utilized in wet metallurgical work, but in this connection, adaptation of the process can sometimes facilitate difficult filtration. This is seen in a patented method adopted in one works for filtering zinc sulphide, which in the ordinary way is notoriously difficult, if not impossible, to filter. This depends on the fact that if some 50 per cent of the zinc content of a chloride or sulphate solution is precipitated as sulphide, and is still faintly acid, it filters with the greatest ease.

Subsequently, fractional precipitation of the kind then proceeds on the same lines, filtering off 25, 12½, 6¼, and, if necessary, 3 per cent, by successive treatments. The chrome works generally differ from most of the ordinary extraction plants in that the final products are relatively valuable colours, and thus justify use of the best filtering and drying systems. In one of the few processes engaged on wet tin and antimony sulphide extraction from complex residues, approximately one ton of the fused material was digested in 900 gallons of water, but using ceremic-lined vacuum filters, occupied from between two and three days to filter off completely.

The engineering aspect in each of these connections of filtering and drying is governed by economical features, as no one system will suffice satisfactorily, and selection of the most appropriate plant can only be successful when taken from actual experience. Makers' circulars not infrequently emphasize features which, although mechanically sound, may not meet specific requirements. Vacuum-cell filters which are used in washing plants at mines, where the solids are recovered from sludgy solutions formed in the dressing process, are likewise used in aluminium extraction.

EXTERNAL DRUM FILTERS

External drum-type filters in general are immersed to a depth of some one-third of their surface in a trough filled with the turbid solution, wherein the solids are drawn to the surface by suction, and after a revolution around the horizontal axis, the liquor is discharged. A refinement of this is seen in one design of drum filter where the first operation takes place at the inner side, after which the cake is mechanically removed and washed, and then once more filtered on the outer side. Drum filters of the kind have an effective area of some 70 sq. ft.[1]

Another arrangement of external filter with lateral filtering trough differs in design from the normal construction. The principal feature here is that the filtering trough is laterally in contact with it, instead of being disposed below the filtering drum. The object of this is to prevent heavy and coarse particles from being deposited in the trough, while all solid particles are uniformly sucked on the filter, and which design holds other advantages.[2] From another aspect, a further form of machine which operates on the principle of the external top-feed filter, is the twin-drum filter. Apart from washing-liquid being sucked through the cake, and thereby displacing the last remnants of the liquor, the specific gravity of the sinking solid constituents is taken advantage of to increase output.[3]

Where sludgy solutions of specially low solid contents have to be dealt with, filters which are characterized by their large immersion depth are preferred. This sometimes extends close up to the crown of the filter, and by which expedient, an extra large suction surface is provided. These outfits are complimented by disc filters with several discs on the one shaft, and which are engaged in certain of the rare metal extraction processes.[4] The cord filter holds specific advantages for various types of filtration activities, and has already seen use in selenium, tellurium, and precious metal recovery. The main advantages relate to the removal of the filter cake from the filter drum, and which method provides for a system of cords, or a band, which passes over the drum, and over an auxiliary roller. In this way, the material is continuously removed, and very much more quickly than had previously been possible

by the usual scraper system. By a modification of the same principle, the band is appreciably lengthened and led through a drying apparatus, where it is suspended in loops. It remains there until the material has become dry and falls.

Although between the ordinary external drum filter and the cord filter, technical differences in design alone exist, there are fundamental differences between internal and external constructions.

The drum is subdivided into suction, water extraction, removal, and cleaning zones, and the removal zone is located directly behind the top centre of the internal filter, whereas in the external filter, it is by from 60 to 80 degrees beyond the top centre. The cord arrangement is seen to best advantage where one of the segments of the drum, as distinct from being under vacuum, is exposed to pressure.

In this way, this segment is in best condition to receive the relatively gentle rubbing action of a spirally-operated brush arrangement, while the band surfaces can be thoroughly cleansed in passage before returning for further use.[5] Mention might also be made of an improvement introduced for use on the conventional filter-press, which consists of substituting what are known as "flexible filter-stones" in place of the familiar filter cloths, which tend to wear out rapidly and are unhandy to use.[6]

DRYING PRECIPITATES AND CRYSTALS

The drying of metallurgical products ranging from ores and precipitates to crystals is only infrequently carried out with the precision demanded of the associated chemical industry. Briefly, nickel and cobalt ores which necessitate briquetting, require to be calcined to a fixed moisture content to facilitate the best bonding, which is performed on single deck calciners equipped with rotating arm rakes.

Precipitated aluminium hydroxide, prior to reduction to metallic aluminium, has to be calcined to a much higher degree to convert to alumina using tubular rotary kilns. Certain of the latest nickel works have adopted corresponding methods, and have introduced coal-fired rotary dryers, and which, depending on the nature of the material, may require from 300 deg. to 400 deg. C. to get rid of combined water.[7] Precipitated copper prior to smelting has only to get rid of actual moisture, and hence the use of open steam-heated dryers at around 120 deg. C. Small smelters of tin-lead residues handling purchased precipitates and other tin-bearing materials, have them agglomerated with cement, for passing the broken-up mass into the blast furnace, and thus bypass the need for drying.

ROTARY VACUUM DRYERS

The fact that some small moisture content remains is often of only secondary importance, as distinct from the drying of finished products in the chemical industry where removal of the last 0.5 per cent of moisture consumes up to 50 per cent more fuel. As distinct from drying practice with most of the heavy metals, the latest rotary vacuum dryers are required with rare metal precipitates, in the chrome industry where the finished products are largely valuable pigments, and in the electrolytic production of white lead, oxides, and hydrates, etc. Vacuum two-cylinder film dryers with connected scoop-type dryer are used for these latter purposes. The two heated cylinders revolve in opposite directions and thereby permit the thickness of the film or layer to be regulated, irrespective of the adhesive properties which may obtain.

The structure of the dried material may be modified within certain limits in order to cause it to issue as flakes, or in the form of powder of greater or lesser fineness. In the final stage, the connected scoop dryer causes the material to be upraised and dropped continuously under the desired heated vacuum conditions at a pre-determined speed. In the production of cerium chloride, the finished product may be obtained directly from the solution in one operation. The main items of the outfit comprise the two-cylinder dryer, pressure pump, overflow valve, feed-line scoop dryer, Y-tube with change-over flap, receiving bins, conveying screw, and discharge doors. This arrangement is suitable for pulp-like, viscuous, and pasty materials, as distinct from the single-cylinder film dryer, which is limited to the thinness of the wet masses.

CHEMICAL REACTION

Formerly, drying of the kind was a slow process, but to-day these units can handle some two tons per hour at much higher thermal efficiency than the conventional calcining oven.[8] The use of the continuous scooping arrangement pre-supposes material which can be readily scooped, and also not damaged by the treatment. Although claimed to suffice for crystals, a gentler action is accorded by another form of rotary vacuum dryer, wherein louvre plates having a double stage on the feed-end, permit two-stage drying in the one unit.

Some of these rotary dryers are 35 ft. in length, and 11½ ft. in diameter, rotated by electric motor through enclosed herringbone-gear speed reducer to operate at a specific speed. The wet crystals are discharged to the dryer, wherein hot air passes from separate ducts through the material, and by means of conveyor are carried away in dry condition. As most of the moisture is in the form of water of crystallization, the crystals are very sensitive to the amount of heat which may be applied, and they could be rendered fluid and otherwise damaged by excessive heat. This applies alike to zinc sulphate, copper sulphate, nickel sulphate, and a number of other crystal salts from metallurgical operations, and where advantage is taken of hot flue gases from other activities.

Considering the individual case of zinc sulphate, it is seen that one of these units reduces the moisture content from 48 to 18 per cent at a feed rate of some 8,000 lb. per hour. These crystals are obtained from the leach plant by cooling concentrated liquor in a vacuum crystallizer, passed through the rotary vacuum filter, and from thence to the foregoing drying equipment. This speedy drying became imperative in order to keep the subsequently used roasters in full operation, and where at some 750 deg. C. the crystals are converted to zinc oxide and sulphur dioxide, but which work can be materially impaired by the presence of a high moisture content.[9]

Lastly, it has to be observed that filtration and drying activities in the metallurgical field generally tend to vary from the high-grade chemical engineering outfits necessary in efficiently producing colours, tanning products, foodstuffs, organic and inorganic salts, and other products, and are only required, as a rule, for the rarer metals and electrolytic products. Exceptions to this are seen in production of the various sulphate crystal by-products mentioned.

REFERENCES

[1] Maschinenfabrik Buckau R. Wolf A.G., Magdeburg
[2] Schuchtermann and Kremer-Baum, Dortmund.
[3] Maschinenfabrik Gerlach, Nordhausen.
[4] Maschinenfabrik Buckau R. Wolf A. G., Magdeburg.
[5] Imperial G.m.b.H., Meissen.
[6] W. Schuler, Grunstadt-Pflaz.
[7] Allis-Chalmers Co., Milwaukee, Winconsin, U.S.A.
[8] Deutsche Vakuumapparate, G.m.b.H., Erfurt.
[9] Link-Belt Company, Chicago, U.S.A.

Increased Uranium Prospecting Activities in Australia

The search for uranium is being carried on with increasing vigour in Australia, where the most promising uranium-bearing regions to date are the Mount Isa-Cloncurry district of North Queensland and the Rum Jungle field in Northern Territory. In the following article our Australian correspondent gives a brief resumé of the potentialities of these areas, and points out that the search has been stimulated by private enterprise.

Activity in the search for uranium continues to increase in Australia. Existing companies are expanding operations, and new flotations are made almost weekly.

The most important regions of Australia are North Queensland and the Northern Territory where private enterprise has been encouraged with the result that there has been a steady succession of discoveries. South Australia, on the other hand, is an exclusive Government preserve,

During 1952 costeaning was undertaken to determine the extent of the Rum Jungle field

consequently there is no interest in search, even if permitted. Western Australia has made a few discoveries, and prospecting in New South Wales has been still less successful.

PROMISING URANIUM DEPOSITS

The outstanding region so far, is the Mount Isa-Cloncurry district in North Queensland, which gives promise of big things. It is notable, too, in that the nature of the ores differs from that of the Northern Territory occurrences in two principal factors; there is an almost total absence of secondary minerals, and the ores are calcitic. Superficial ores are uranophane, with pitchblende very close to surface. There is no particularly favourable host rock, the occurrences being found in amphibolite, haematite-quartzite, quartzite, highly altered sediments generally, and limestone.

In the Northern Territory, development of the Rum Jungle deposits by Zinc Corporation Ltd. on behalf of the Commonwealth Government, has disclosed productive possibilities more than twice as great as were originally expected, which will mean a large expansion in the mining and treatment policy at that centre.

Apart from this big mine, small producers are now stockpiling, or consigning small lots of ore to Rum Jungle for treatment. So far, all discoveries have been small compared with Rum Jungle, but considerable interest has attached to the recent discovery by North Australian Uranium Corporation of what appears to be a large deposit 72 miles east of Pine Creek. Samples are stated to have assayed from 0.4 to 2.48 per cent uranium oxide; disclosed width is 25 ft. for a length, so far exposed, of 150 ft., but the radio-active line is reported to be traceable for about 1½ miles.

THE MOUNT ISA FIELD

The Mount Isa field holds two large discoveries. The Anderson's lode on the Counter lease has surface dimensions of about 130 ft. by 70 ft., which has been systematically prospected by costeans and radiometric survey, and sampling and assaying of the costeans has, up to date, shown an average grade of 0.75 per cent uranium oxide. This discovery has been dwarfed by the discovery of the Mary Kathleen occurrence, with an outcrop area 400 ft. by 300 ft.; the grade is given as 0.5 per cent uranium oxide.

The purchase of this lease was effected for the sum of £A250,000, there being keen competition for ownership, and boom time conditions prevailing on the field have made high purchase prices inevitable. The property has been bought by Australasian Oil Exploration Ltd.—which company is about to commence drilling for oil on Reid's Dome near Springsure, much nearer the coast. The same company also owns the Counter lease, containing Anderson's lode, and several other radio-active occurrences of promise.

Diamond drilling at Rum Jungle in 1952

Gold Mines of Australia is developing a uranium-bearing line of country at Cloncurry, and other interests are actively engaged. The importance of Northern Australia as a uranium field appears to be well assured, but some time must necessarily elapse before potentialities can be assessed with any degree of accuracy.

Relationship of Roof Bolting to Safety in Iron Ore Mines

The article which follows is condensed from U.S. Bureau of Mines *Information Circular 7678*, by H. C. Young, roof bolting technician, Accident Prevention and Health Division of the Bureau. Of particular interest is the fact that with the exception of one fatality caused by bolted roof failure, no lost time accidents were attributed to bolted roof installations in Alabama iron-ore mines during the five-year period other than those suffered at the initial installation of the bolts.

The Birmingham district of Alabama, which ranks as one of the important iron and steel centres of the United States, holds large deposits of red haematite, coal, and flux and extends from Springville on the north-east to below Vance on the south-west. Although the belt is about 75 miles long, only a relatively small part is now productive. Most of the mining is confined to a section about 10 miles long between Birmingham and Bessemer, within which lie the so-called merchantable ores. The ores lie as bedded deposits in Red Mountain, which extends north-east and south-west between Birmingham and Bessemer and beyond, although the most important part of the district is between the cities named.

The roof overlying the ore beds consists mainly of bedded ferruginous and non-ferruginous sandstone interbedded with layers of hard sandy shale. In some areas a tough cap rock or draw rock (partly ore and rock) ranging from a few inches to 36 in. in thickness separated the ore seams and main roof. The roof strata ranges from thin laminations to layers several feet in thickness, and in some cases is of massive formation. The roof at certain locations has slips, pots, rolls, faults, and other planes of weakness. At some locations the roof strata is tough, strong, and generally self supporting, however, most of the strata at other localities are structurally weak and have a tendency to break away in flat pieces and tabular slabs, and falls progressively unless supported.

ROOF BOLTING SYSTEM

The system of roof bolting adopted for the ore mines varied with roof conditions encountered. The spacing between bolts across the openings and along the openings ranged from 4 ft. to 8 ft., the majority of bolting being done on a maximum of 5 ft. spacing. The number of bolts that were used across the openings was determined by the spacing and the width of places. All mines, except one, used the 1 in. dia. slit-and-wedge-type bolt, and the one mine used a ¾ in. dia. expansion type. Bolts varied in lengths ranging from 36 in. to 120 in.; the lengths most commonly used were between and including 36 in. and 72 in. Bolts 96 in. and 120 in. long were only used under special conditions in reinforcing heavy and faulty roof.

In some mines all bolting was done vertically, using an individual steel bearing plate on each bolt while in others a combination of vertical bolting and angle bolting was followed. The combination system required that bolts used near the rib lines be installed at an angle of about 60 deg. or 65 deg. from the horizontal over the ribs and that the intermediate bolts be installed vertically. This system was generally used where roof conditions were poor or the roof showed signs of taking weight.

In workings that have a short life, such as rooms, the bolts were installed with individual steel bearing plates, and in entries that have a long life a continuous steel bearing plate of 5 in. steel channel, 20 ft. in length, was utilized with each set of bolts. Where this plan was followed, entries and rooms were usually driven 20 ft. to 32 ft. in width, and a set of five bolts was used across the openings and the same plan was followed, whether continuous or individual bearing plates were used.

PLACING THE BOLTS

Percussion drilling with stopers, in which water was used to control the dust, was followed in all ore mines in boring the bolt holes. Air impact wrenches were used to tighten nuts. Stationary compressors on the surface of various mines furnished air for stoper and impact wrench operation and also for the face-drilling equipment.

In all mines bolt holes were drilled with tungsten carbide-insert bits, the type and size of bits used being 1⅛ in. chisel point in two mines, 1⅜ in. four point in one mine, and 1¼ in. chisel point in seven mines. Conventional stopers with various length air legs were used to bore the holes in all of the ore mines. Stoper drilling in most instances was done from the bottom or footwall although at high places in some mines drilling was done from wooden platforms or scaffolds, and in other mines the installations were made from atop self-propelled machines with variable height platforms.

In ore mines being robbed, the slabbing method of recovery was generally followed. By this system openings were driven in widths ranging from 20 ft. to 25 ft. and roof bolted during first mining, after which a single 6 ft. to 7 ft. slab was robbed from each side of the pillars left standing. In some mines the slabbed areas were roof bolted on 4 ft. or 5 ft. centres while loading was in progress, and in other mines the slabbed areas were not roof bolted.

FAILURE OF BOLTED ROOF

Since roof bolting was begun there have been failures of bolted roof in most of the iron-ore mines in which roof bolts have been used. In mines free of failures, bolting has been done on a small scale or was confined to narrow entries. The number of failures in each mine varied with roof conditions and the amount of bolting done and the majority of failures were in the larger operations where roof conditions were poor or faulty. In some mines having fairly strong roof where a considerable amount of roof bolting had been done for over three years, there had been only one, two, or three failures in each mine, many occurring when roof bolting was relatively new and experimental work was being done to determine the applicability of roof-bolt installation.

It was found during the experimental periods that, to support the roof properly with bolts, it was at times necesary to reduce the width of places, install additional bolts, or install longer bolts. It was also learned in other instances that places could be widened, that shorter bolts could be used, or that spacing of the bolts could be increased safely. It was also determined that roof bolting alone was not adequate under all conditions. In mines where the roof was structurally weak and the thickness of the vein precluded the use of longer bolts, it was necessary to adopt combinations of bolting and timbering.

Only a few of the total failures to date occurred in the

immediate areas of the working faces, and the majority of falls were of roof that had been bolted and standing for periods ranging from a few weeks to several years. The majority of failures in the past were at crosscut and room-neck intersections and at wide places where additional area was exposed, and most failures were of roof that had been bolted in accordance with a predetermined plan. In these instances of failure the bolting plans were inadequate because of changes in the physical features of the roof at local areas in which the strata contained faults, slip planes, rolls, angular joints, and vertical joints. Other failures of bolted roof throughout the coal and iron-ore mines were caused by one or more conditions :

(a) Bolting loose or broken roof and installing bolts in roof that had sagged.
(b) Poor anchorage of bolts, caused by not driving the bolts over the wedges to refusal, the diameter of the holes too large, or the wedges too thin or both, anchoring in soft material, and drilling the bolt holes too deep for proper anchorage of the slit-and-wedge-type bolts.
(c) Spans too wide for roof conditions and length of bolts used.
(d) Bolting in roof that was unsuitable for roof bolts alone.
(e) Bolts too short to extend through draw rock or faulty roof and be anchored in firm roof.

With the experience gained in detecting doubtful roof in five years of roof bolting, much has been done in preventing failures. In comparison to the amount of bolting done, failures are far fewer now than they were in the past. Failures of bolted roof that would have taken place in the past are now prevented by taking precautionary measures when heavy or faulty roof conditions are detected by installing additional bolts or longer bolts or both, or reinforcing the weak areas by timbering.

THE SAFETY FACTOR

It is interesting to note that from the time roof bolting was introduced in May, 1948 until May, 1953, one fatality was caused by failure of bolted roof in an iron-ore mine and during the five years there were no lost-time accidents in iron-ore mines from failures of bolted roof. In the same period there were 22 lost-time accidents in the mines in which men were injured in connection with roof bolting activities. These lost-time accidents were caused in various ways, the most common being :

(a) Being struck by small pieces of roof rock falling from between the bolts during bolting and from rock falling while the roof is being scaled in preparing to roof bolt.
(b) Having hands or fingers caught between the roof and drilling equipment during drilling.
(c) Being injured in various ways while handling and using bolting equipment and supplies, such as drill steel breaking, drill steel falling from bolt holes, and stoper drills out of control.
(d) Eye injuries from particles of flying rock in collaring the bolt holes.

Prevention of roof-fall accidents and increased tonnages generally obtained in roof-bolted areas are the chief benefits of roof bolting. Roof bolting not only reduces roof-fall accidents, but it also should be credited with preventing many other types of accidents that occur in various ways when timbering is used. Besides roof support, many benefits that do not show directly in statistics have been derived from this type of roof control, such as increased efficiency owing to better ventilation.

Portugal's Mineral Exports

The mineral export figures covering the six month period January-June, 1954, and the figures for the corresponding period of 1953, focus attention on the interesting figure given for wolfram residues of 400 tonnes. This tonnage was exported during May and June of this year and represents the accumulation of material over a period of some four years, their export being out of the question previously owing to the export tax imposed. While the position is not yet wholly satisfactory, it is better due to a reduction in the export tax, writes our Portuguese correspondent.

Minerals	*Tonnes*	
	1954 (Jan.-June)	*1953 (Jan.-June)*
WO_3	1,210	1,476
WO_3 (Residues below 25 per cent WO_3)	400	Nil
Sn	387	827
Sn (Metal)	179	25¾
Cupreous Pyrites	182,189	139,750
Other Pyrites	86,500	116,600
White Arsenic	437½	695

With the present world market prices and the export tax and duties in force here, Portugal cannot hope to compete with other producing countries and the time is not far off when normal tungsten ores will be a very dead letter. Organized mining is known only by S. Domingos, the Belgian copper pyrites mines at Aljustrel, Beralt, Borralha, Tuella, the Companhia Mineira do Norte de Portugal, Sociedade Nacional de Minas and two or three others.

Correspondence

COMPRESSED AIR SUPPLIES FOR MINES OF THE WITWATERSRAND

The Editor, *The Mining Journal*,

Sir,—We were interested to read in a recent issue of your journal, an article on " Compressed Air-Supplies for Mines of the Witwatersrand," by Mr. A. G. Thomson.

This article gives an excellent summary of the unique method evolved for the supply of compressed air to the Rand mines, but we were surprised to see that Mr. Thomson had made no mention at all of the part played by the late Mr. J. L. Hodgson, then Scientific Advisor of George Kent Ltd., in the conception and execution of this scheme. We think it is universally agreed that Mr. Hodgson's genius in solving the problem of the commercial measurement of compressed air was a major factor in the success of the project.

Perhaps we may refer Mr. Thomson and your readers to Mr. Hodgson's own account of this work, published in the *Proceedings of the Institution of Civil Engineers*, 1917, Volume CCiv. This paper is still regarded as a standard work, and won for Mr. Hodgson the Telford Premium of the Institution.

The Venturi meters and gate meters mentioned by Mr. Thomson were designed by Mr. Hodgson, as well as a number of other instruments and valves. It is, of course, true that accurate and reliable measurement was the core and kernel of the scheme, and Mr. Thomson's description at any rate gives further proof that the core was sound.

Yours faithfully,
R. E. HANDFORD
(Director).

August 25, 1954.
George Kent Ltd.,
Luton, Bedfordshire.

TECHNICAL BRIEFS

The Carbonate Leaching of Pitch-blende

A new process for the extraction of uranium from pitch-blende ores has been described by F. A. Forward and J. Halpern (*Trans. Can. Inst. Min. Met.* 56). The method is especially suitable for the treatment of low-grade ores having a carbonate content too high to permit economical extraction by a conventional acid leaching procedure. When pitch-blende is brought into contact with aqueous carbonate solutions and oxygen, the uranium is oxidized to the hexavalent state and dissolves as a complex uranyl carbonate. Accumulation of hydroxyl ions in the solution as the leaching proceeds causes reprecipitation of the uranium as sodium uranate and in order to avoid this some bicarbonate must be present.

The general procedure is as follows. The ore, crushed to minus 10 mesh, is rod-milled for an hour to produce a grind of about 90 per cent minus 200 mesh. The leaching rate increases with the fineness of the grind although the total final extraction remains at about 93 per cent provided that the particle size does not become greater than 100 mesh. After milling, the ore is made up with water and sodium carbonate to a suitable pulp density and composition and transferred to an autoclave heated by an internal steam coil. The pulp, heated to 100 deg. C., and subjected to an oxygen pressure of between 1 and 2 atmospheres, is agitated for between 3 and 20 hours depending upon the uranium content of the ore. The sodium carbonate concentration of the pulp should not exceed 50 g. per litre and the temperature should not exceed 115 deg. C. otherwise excessive amounts of silica will be dissolved. The rate of leaching is proportional to the square root of the oxygen pressure and although air may be used in place of pure oxygen the total pressure must be raised correspondingly to maintain the same partial pressure of oxygen.

Precipitation of the uranium from solution may be achieved by reducing to the tetravalent state when the uranium does not form a carbonate complex. Reduction is achieved with commercial hydrogen under pressure in the presence of a nickel powder catalyst. The pressure used is 8 atmospheres and the temperature 120 deg. when precipitation is virtually complete.

Wide Uses of Density Gauge

Designed as a versatile instrument that will meet a number of industrial uses, the new density gauge, manufactured by Isotope Products Ltd., Canada, is claimed to measure such diverse products as mine and mill concentrates, other industrial fluids, powdered solids and like materials. The density gauge is one of the group of gammagage instruments which are harnessing gamma radiation to a range of applications. One type of gammagage is used to detect and plot corrosion patterns while another type measures liquid level in vessels.

In recent tests conducted in Canada, the Isotope density gauge has determined its valve as a batching indicator, and has measured the density and settling rate of a pigment suspension. It will later be tested for the control of asbestos pulp and the control of concentration of uranium from pitch blende ores.

The Potentialities of Thermenol

A new metallurgical possibility is a material named Thermenol, according to T. C. Du Mond, general chairman of the Basic Materials Conference held earlier this year in the United States. Developed in an attempt to find an inexpensive electrical core material that could be made of non-strategic materials, Thermenol might be used for some applications now utilizing stainless steel, while should the results of early tests prove valid, the material might do most of the things for which titanium is now being considered.

Thermenol is an alloy composed of 14 per cent aluminium, 80 per cent iron and 4 to 5 per cent molybdenum or vanadium. Theoretically, such an alloy could not be ductile, but Thermenol is easily worked, is light in weight (about 25 per cent the weight of stainless), has high electrical resistance, is corrosion resistant and has good tensile strength.

REVIEWS

Colliery Year Book and Coal Trades Directory, 1954, *32nd Edition. Published June 1954, by The Louis Cassier Co. Ltd., Dorset House, Stamford Street, London, S.E.1. Price 30s. net (By post 31s. 3d.)*

This 32nd edition of the *Colliery Year Book* presents in a convenient and reliable form the most comprehensive information on the coal mining and allied industries. While the general layout of the book and the position of the principle features remains as in the last edition, the whole work has been completely revised.

Particulars of the continental coal mines, thoroughly revised, is renewed as a feature while in addition, the bibliography of literature on coal mining has been extended to include books and reports published in other countries. A report on the policy and work of the Coal Utilization Council organization has been introduced for general information.

In a foreword, Sir Hubert Houldsworth, chairman of the N.C.B., draws attention to the task ahead as being a formidable one and points out that the real benefit still to accrue is from the large reconstruction programme already under way and states that the *Colliery Year Book* once more presents valuable and important data about the industry.

Contribution a l'etude du revenu national, *an essay on combustible mineral solids, by M. E. Ventura, Chief Engineer of Mines, Director of the Mineral Documentation Bureau. Annales des Mines, iv-v, pp. 21-27. Published by M. Dumas, 9 rue Jules Lefebvre, Paris 9e, France.*

Of interest in a recent issue of *Annales des Mines*, published by the Commission des Annales des Mines, 9 rue Jules Lefebvre, Paris 9e, is an article on combustible mineral solids by M. E. Ventura, Chief Mining Engineer and Director of the Bureau of Mining Statistics, recalling the methods employed by the French Department of National Finance and taking the position of combustible mineral solids as an illustration of inter-industrial relations.

This detailed study for the year 1952, undertaken with the help of the coal mining profession, examines the relations between the economic units created by the centralization of the various branches of the industry (under the headings of production, processing, distribution and consumption) of combustible mineral solids.

Gold Dish and Kava Bowl, *by John A. Fraser. Published by J. M. Dent and Sons Ltd. Pp. 262, with index, maps and illustrations in half tone. Price 18s.*

The author is an Australian who has worked as a prospector in Australia, Fiji and the Solomon Islands, and the work under review is a fascinating study of mining activities, native life and local colour, centred mainly in Fiji. The origins of the Emperor and Loloma properties will be of especial interest, and the whole makes remarkably good light reading for the leisure hours.

The Law Relating to Explosives, *by H. E. Watts, C.B., M.B.E., G.M., B.Sc., Ph.D., F.R.I.C. Published by Charles Griffin and Co. Ltd. Pp. 387. Price 40s. (Postage 1s. 1d.).*

Dealing with the manufacture, storage, packing, sale and transportation of explosives, the volume under review affords guidance to all who are concerned with the administration of the Explosives Acts, and as such, provides a valuable work of reference. The author is H.M. Chief Inspector of Explosives, and in these pages he has gathered together all points of law relating to one subject. This useful approach, together with illustrations loaned for publication by Imperial Chemical Industries Ltd., has considerably enhanced the stature of the work.

METALS, MINERALS AND ALLOYS

COPPER.—The cumulative effect of the strikes at Chilean and U.S. copper mines has exerted further pressure on prices both here and in New York during the past week. On the London Metal Exchange cash copper has advanced £14 per ton in the past seven days, while in the States, although the price is still officially regarded as 30 c., we have heard of prices as high as 32½ c. being paid and more asked for by some dealers. Custom smelters, however, have so far refused to raise their buying price, although their production is fully sold up to the end of October. All offers of electrolytic copper for export from the States have been withdrawn for the rest of this year although some business was done this week for the first quarter of 1955 on a 30 c. basis f.a.s. New York.

It has been estimated that copper losses due to the Chilean and American stoppages had amounted to around 57,000 tons up to September 15. The total losses will, of course, be greater than this as the strike situation is by no means resolved as yet. So far as Chile is concerned, it now seems doubtful whether she will be able to meet all her delivery commitments for the remainder of the year.

In Chile the emergency decrees and show of military strength, reported here last week, resulted in the El Teniente strikers returning to work last Monday, although on what basis is not entirely clear. On the one hand, strikers are reported to have accepted the Government offer of a 26 per cent wage increase and other minor benefits, while subsequently it was stated that the strikers were returning to work pending the settlement of the dispute by a tripartite arbitration tribunal comprising representatives of the Government, the Braden Copper Company and the miners. As the Braden Co. were not a party to the 26 per cent wage increase offered by the Government, this is presumably some form of temporary arrangement underwritten by the latter pending a more final settlement. Strikers who had come out in sympathy at Chuquicamata began returning to work on Tuesday, but as we go to press there is as yet no news of the ending of the sympathy strike at Potrerillos.

Little progress appears to have been made in settling the strikes which were still in force a week ago in the States. The A.S. and R.'s Garfield smelter which has a monthly output of 20,000 tons and Kennecott's Garfield refinery are still shut down and Kennecott stated this week that their Utah mines and concentration mills would have to cut back to a four day week beginning next Monday if the smelter and refinery strikes were not over. Anaconda's mines and plants in Montana are still closed and there is no settlement in sight.

With so much news pointing to an increasing tightness in copper supplies during the next few months, it is no surprise to learn that a number of big American copper users are sounding out Washington on the feasibility of tonnages being released to the market from the stockpile. It is being pointed out that precedent for this exists in the action taken by President Truman in 1952 when he authorized the release of 22,000 from the stockpile following the suspension of Chilean copper shipments which had resulted at that time from strikes and from the Chilean Government's efforts at market manipulation. It seems probable that if sales or loans from the stockpile were authorized, these would be limited to users working on defence orders.

In the present situation it must be a matter for disappointment, to say the least, to all those associated with Rhodesian copper production that their intractable coal supply problem still prevents them from stepping in to fill the vacuum in this eminently profitable dollar market.

LEAD AND ZINC.—In the States no further price increases have been recorded by either metal since last week, although buying activity is reported fair at the new prices. Unless London prices go markedly higher there therefore seems no immediate reason to look for further advances in New York.

U.S. zinc men report a better tone in the buying of higher grades of the metal, particularly in the die-casting industry, which is now entering a seasonal period of activity as the automobile industry comes into production with its 1955 models.

The healthier tone in zinc is reflected in the news that the United Park City Mines Company in Utah is to resume operations towards the end of this month after a two-year shutdown. It is expected that this lead-silver-zinc property will be producing at a monthly rate of 6,500 tons by the end of the year.

TIN.—The Interim Committee of the International Tin Council held a further meeting in London this week, the outcome of which is discussed elsewhere under "Notes and Comments."

We give below latest Tin Study Group production figures for the main producing countries.

Country	*Period*	*1954*	*1953*
Belgian Congo	Jan-Aug	6,954	8,983
Bolivia*	Jan-June	13,186†	17,793
Indonesia	Jan-Aug	22,863	21,818
Malaya	Jan-Aug	39,834	36,744
Nigeria	Jan-July	4,529	4,742
Thailand	Jan-May	3,775	4,277

* Exports † Estimated

The Congo and Bolivian figures continue to be of particular interest. In the case of the Congo, production to date suggests a total for the full year of little more than 10,000 tons compared with 17,000 tons last year. On the other hand A. Strauss and Co., state in the September issue of their monthly *Tin Review* that they know for certain that there has been no appreciable slackening in Congo production this year and suggest that the figures must be the result of some local statistical re-adjustment. They forecast Congo output for the year at around 13,000 tons. On the other hand the Review anticipates a substantial reduction in Bolivian production, which Strauss and Co. believe is progressively falling to a rate of two-thirds or less of last year's 31,000 tons. In this connection it must, of course, bt remembered that the monthly Tin Study Group figures for Bolivia are export figures and to this extent do not immediately reflect production trends.

It is interesting to note that tin appears under two categories of stockpile purchase budgeted for the current year, to which detailed reference is made under "Notes and Comments." Tin has been included, along with lead, zinc and manganese in the long-term stockpile programme on which an unspecified amount of money is to be spent, and it is also named as a metal which may be purchased with counterpart funds obtained from the sale of surplus farm commodities.

ALUMINIUM.—World production of bauxite in 1953 reached an all-time record of 13,779,000 tons compared with 12,539,000 tons in 1952 and 10,610,000 tons in 1951. U.S. imports and consumption at 4,388,623 tons and 5,559,409 tons respectively also reached new levels, but domestic production at 1,579,739 tons was approximately 5 per cent below the output achieved in 1952, which reached 1,667,047 tons.

Aluminium stocks held by smelters at the end of July last totalled 75,621 tons—the largest quantity so held since July 1947 when 78,054 tons were on hand. A sign, perhaps, of the present strong supply position is suggested in the report that Aluminium Ltd. is seeking more long-term contracts in the United States on which to plan future expansion.

ASBESTOS.—According to the Philadelphia organ *Asbestos*, production of and demand for asbestos fibre has changed little in recent months, all grades being in ample supply even spinning fibre. While the overall total output is running slightly below the figures for 1953, a seasonal pick-up has taken place in some of the major uses of asbestos shorts and with navigation opened foreign shipments are running at the year's high.

COLUMBIUM/TANTALUM.—Negotiations initiated during the June quarter, when concluded, will lead to the development of the largest known columbium/tantalum deposit in the United States, according to a report of activities of the

G.S.A. during the period April-June, 1954. The deposit is situated in Idaho and its successful development will, it is estimated, produce more than 1,000,000 lb. of combined pentoxide in a five-year period. The G.S.A. report adds that research activities are continuing efforts to develop improved processes for the separation of tantalum from columbium. Meanwhile, tantalum continues to be in very short supply.

Iron and Steel

The expansion of demand for iron and steel is now world-wide in its incidence. American steel production, though still far below capacity limits, is beginning to show signs of returning animation, and on the Continent there has been an upturn in prices and production. In both respects the U.K. steel industry enjoys a pronounced lead. Outputs have been restored to peak levels, prices are competitive, exports expanding, and home demand has never been more substantial. Further expansion moreover has been made easier of attainment by the accumulation of exceptionally heavy stocks of imported ores and scrap.

Although ample supplies of ferrous scrap are at present available, the position calls for close attention. Imports this year have been on a smaller scale than in either 1952 or 1953, and a further shrinkage is foreshadowed. It is announced from Dusseldorf that imports of scrap into the six countries of the European Coal and Steel Pool are to be raised by 900,000 tons by the end of this year. Already 100,000 tons of American scrap have arrived, and a further 500,000 tons have been purchased at prices ranging up to $40 a ton c.i.f. This is bound to restrict still further Britain's external sources of supply and increase the steel industry's dependence upon a regular flow of home scrap.

Pig iron production is now rapidly approaching the requirements of the steel works and foundries. Only low and medium phosphorous grades which are used extensively in the engineering foundries are still scarce, whilst the steel works have thus far been able to meet the heavy increases in the consumption of semi-finished steel consequent upon the restoration of the re-rolling mills to full-scale activity. These mills have now an abundance of orders from home and foreign sources, but there are complaints that prices of light bars and sections are unremunerative.

By concentrated effort production of plates has been raised to a level which has almost overtaken home requirements but rollers of heavy sections and joists have received such a rush of orders of late that some of them have closed their books for this year. Imports from the Continent are subject to a duty of 33⅓ per cent which effectively excludes any supplies from that source.

The London Metal Market

(From Our Metal Exchange Correspondent)

The tin market maintains a good undertone and demand here keeps up well. There is some uneasiness about Formosa and this, no doubt, is exerting its influence in keeping the market at its present level, but on the other hand, with tin production being absorbed as well as it is, that may not be the only reason for the apparent stability of prices. In the U.S.A., buying by consumers has been slow. It is interesting to note that Canada has ratified the International Tin Agreement and is the first consumer country to do so. The Interim Committee of the Council held a meeting in London on September 20 and 21 to draw up draft rules of procedure and draft agenda for submission to the International Tin Council at its first meeting, expected to be held towards the end of 1954. The Eastern price on Thursday morning was equivalent to £749 per ton c.i.f. Europe.

Copper has been a very strong market and, helped by covering of short positions on the London market, the backwardation has widened considerably. The strike situation in Chile has been eased somewhat by the return to work at some plants, but the Potrerillos mines are apparently still idle, although the company was hopeful of a resumption of work shortly. However, the fact remains that a very considerable tonnage of production has been lost and a very tight supply position is likely, at any rate for the rest of the year. It is reported that electrolytic copper offers from the U.S.A. have been withdrawn for the remainder of this year, but that some business has been done at 30 c. f.a.s. New York for the first quarter of 1955. In the meantime, it is understood that 32½ c. has been paid for this year's shipment, and that dealers are now asking as high as 33 c.

The lead market is not overburdened with supplies for prompt delivery, and arrivals seem well taken care of, consumptive demand being well maintained, whilst there appears to be some demand for Russian account. In America, buying is reported as fair.

Zinc consumption continues at a good rate on this side of the Atlantic, but in America business continues rather sluggish with the price maintained at 11½ c. per lb.

Closing prices and turnovers are given in the following table:—

	September 16		September 23	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Tin				
Cash	£736	£736½	£737½	£738
Three months	£736	£737	£737½	£738
Settlement	£736½		£738	
Week's turnover	605 tons		425 tons	
Lead				
Current month	£101¾	£102¼	£101¼	£102
Three months	£99¾	£100	£99	£99¼
Week's turnover	3,475 tons		2,725 tons	
Zinc				
Current month	£80¾	£81	£81	£81¼
Three months	£80¼	£80¾	£81	£81¼
Week's turnover	4,075 tons		3,250 tons	
Copper				
Cash	£250	£251	£270	£272½
Three months	£242	£242½	£249½	£250
Settlement	£251		£272½	
Week's turnover	5,800 tons		7,425 tons	

OTHER LONDON PRICES — SEPTEMBER 23

ANTIMONY

English (99%) delivered, 10 cwt. and over .. .. £210 per ton
Crude (70%) .. .. .. £200 per ton
Ore (60% basis) .. .. .. 22s./24s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade) .. .. £483 per ton

OTHER METALS

Aluminium, 99.5%, £156 per ton
Bismuth (min. 2 cwt. lots) 16s. lb.
Cadmium (Empire), nominal
Chromium, 6s. 5d./7s. lb.
Cobalt, 21s. lb.
Gold, 250s. 9d. f.oz.
Iridium, £45 oz. nom.
Magnesium, 2s. 4d. lb.
Manganese Metal (96%-98%) £225/£262
Osmiridium, £40 oz. nom.
Osmium, £50 oz. nom.
Palladium, £7 oz.
Platinum, £30/£31
Rhodium, £42 oz.
Ruthenium, £22 10s. oz.
Quicksilver, £105 ex-warehouse
Selenium, 35s. 9d. nom. per lb.
Silver 72d. f.oz. spot and 72¾d. f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth .. .. 65% 8s. 6d. lb. c.i.f.
60% 8s. 3d. lb. c.i.f.

Chrome Ore—
Rhodesian Metallurgical (semi-friable) 48% £12 8s. 0d. per ton c.i.f.
,, Refractory 45% .. £12 14s. 0d. per ton c.i.f.
,, Smalls 44% .. £8 5s. 6d. per ton c.i.f.
Magnesite, ground calcined .. £26-£27 d/d
Magnesite, Raw .. .. .. £10 - £11 d/d
Molybdenite (85% basis) .. 102s. 4d.-103s. per unit c.i.f.
Wolfram and Scheelite (65%) .. 187s. 6d. - 192s. 6d. per unit c.i.f.
,, ,, ,, *U.K. Gov't Stock d/d 190s. per unit inc. charges
Tungsten Metal Powder .. .. 16s. 9d. nom. per lb. (home) (98% Min. W.)
Ferro-tungsten .. .. .. 13s. 9d. nom. per lb. (home)
Carbide, 4-cwt. lots .. .. £37 6s. 3d. d/d per ton
Ferro-manganese, home .. .. £54 15s. 0d. per ton
Manganese Ore Indian c.i.f. Europe (46%-48%) .. .. .. 68d./70d. per unit nom.
Brass Wire .. .. 2s. 7½d. per lb. basis
Brass Tubes, solid drawn .. 2s. ⅝d. per lb. basis

* ex Ministry stock for prompt delivery from September 24

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Kaffirs naturally suffered during the past week from forced speculative selling in particular O.F.S. issues. Wednesday brought in a welcome recovery and there is little doubt that the market will now be in a much healthier position.

Finance houses were irregular but generally retained their stability well in the face of weakness elsewhere. Anglo-French Consolidated, Goldfields, Johnnies and General Mining were good features sustained by steady investment buying.

Individual mines were rather mixed. There was the usual lack of fresh news before the quarterly reports. Some noticeable buying of certain issues took place, however, in anticipation of good results. Doornfontein, Luipaardsvlei and Robinson Deep were all affected in this manner. The growing confidence in the future of gold shares remained unaffected by mixed news from the Union. This included a coal shortage, insufficient rail transport, and lack of skilled labour in the mines, together with the usual political uncertainty. On the credit side, the power supply situation was much improved and has gone a long way towards being completely solved.

Progress in the O.F.S. has been underlined by the recent official opening of President Brand and Harmony and the ceremony at Virginia will take place as we go to press. While prices were affected by the general relapse of speculative issues, the underlying tone was good and much stock appears to have passed into firm hands for the time being. Freddies Consols rose on Cape reports of vigorous development at the property and St. Helena and Western Holdings rose against the trend. Speculative buying of Middle Wits well outweighed profit taking and forced liquidation.

West Africans were quiet but further consideration of the Ashanti news concerning the reef intersection at the 38th level brought in buyers although it will probably be about two years before the company will fully benefit from values at this depth. Taquah hardened on better news concerning the extraction and throughput of the treatment plant.

Diamond shares turned easier despite the maintained interim dividend by De Beers. Market circles expected this but, inevitably, there was some disappointment among speculators. While Watervaal fell, Potgeitersrust went ahead after attention had been drawn to the 1954-55 dividend outlook.

Coppers were good, especially Nchanga. The main gains occurred on Wednesday. The squeeze in metal supplies, mentioned previously in this column, is becoming more apparent and the labour problems in Chile are by no means settled. A feature in recent weeks has been the strength of Tharsis. This appears to be grounded on hopes of a similar arrangement as that recently made by Rio Tinto with the Spanish Government. No news to this effect has been forthcoming from the board.

Eastern tin shares were affected by the Southern Kinta announcement. The company are paying a total dividend of 70 per cent for the year and a capital return of 1s. per share. These good results caused renewed interest in other companies having large cash resources, notably Ipoh, Ayer Hitam, Southern Malayan and Tronoh. Generally speaking, the tin price outlook appears more settled and strong representations are being made with regard to local taxation in Malaya.

Nigerians were less effected by the metal price factor although Jos were firm. Amalgamated Tin fell despite the good dividend. The company are paying 44 per cent for the year against 30 per cent. Gross profits were lower but the easier tax position caused a rise in the net balance. The London tin results, published during the week, show a fall in gross profits of some £172,000 but, due to lower taxation, net income is up by about £35,000.

Elsewhere, Consolidated Murchison suffered a sharp setback due to liquidation of speculative positions. Amalgamated Collieries and Wankie were harder on the strong demand for coal.

FINANCE	Price Sep 22	+ or — on week
African & European	3½	—⅛
Anglo American Corpn.	8⅜	—⅛
Anglo-French	26/10½	+1/1½
Anglo Transvaal Consol.	30/-	.....
Central Mining (£1 shrs.)	44/-	+6d
Consolidated Goldfields	55/6	+3d
Consol. Mines Selection	41/10½	—7½d
East Rand Consols	3/9	.....
General Mining	4¼	+⅛
H.E. Prop. 5/- Shares	11/9	—3d
Henderson's Transvaal	8/3	—3d
Johnnies	50/-XD	+1/-
Rand Mines	3⅛	—⅛
Rand Selection	46/3	+10½d
Union Corp. (2/6 units)	38/3	—3d
Vereeniging Estates	4⅛	—¼
Writs	37/6	+7½d
West Wits	43/6	—6d
RAND GOLD		
Blyvoors	33/6	—3d
Brakpan	7/9	.....
City Deep	15/-	—7½d
Consol. Main Reef	20/-	.....
Crown	41/10½	.....
Daggas	68/1½	.....
Doornfontein	31/9	+9d
Durban Deep	30/-	.....
E. Daggas	12/-	—3d
E. Geduld .. (4/- units)	28/9	+3d
E. Rand Props	21⅛	.....
Geduld	3⅛	—⅛
Govt. Areas	13/-	+6d
Grootvlei	19/-	+6d
Libanon	10/4½	—1½d
Luipaards Vlei	23/3	+1/-
Marievale	19/3	+6d
Modderfontein East	16/3	.....
New Kleinfontein	12/9	+3d
New Pioneer	18/3	—1/3
Randfontein	67/6	.....
Robinson Deep	20/-	+9d
Rose Deep	13/-	—1½d
Simmer & Jack	3/10½	+1½d
S.A. Lands	22/6	.....
Springs	3/4½	.....
Stilfontein	28/10½	—1½d
Sub Nigel	40/-	—1½d
Van Dyk	4/9	.....
Venterspost	12/-	+3d
Vlakfontein	14/3	.....
Vogelstruisbult	36/-	+1/-
West Driefontein	6⅛	—⅛
W. Rand Consolidated	50/7½	.....
Western Reefs	48/1½	—7½d
O.F.S.		
Freddies	8/9	+4½d
Freddies Consolidated	24/1½	+2/1½
F. S. Geduld	6	—⅛
Geoffries	21/-	—2/-
Harmony	40/3	—6d
Loraine	17/6	—6d
Lydenburg Estates	24/-	—3/6
Merriespruit	12/-	—6d
Middle Wits	19/7½	+1/1½
Ofsits	79/9	—2/9
President Brand	75/9	—3/-
President Steyn	41/3	—2/-
St. Helena	34/4½	+4½d
Virginia Ord.	14/7½	—1/7½
Welkom	31/-	—1/-
Western Holdings	5½	+⅛
WEST AFRICAN GOLD		
Amalgamated Banket	1/6	.....
Ariston	6/10½	.....
Ashanti	19/6	+6d
Bibiani	4/3	—1½d
Bremang	1/7½	.....
G.C. Main Reef	3/6	—1½d
Konongo	2/3	.....
Lyndhurst Deep	10½d	.....
Marlu	1/4½	.....
Taquah & Abosso	2/6	+1½d
W. Selection & Dev	6/6	.....
AUSTRALIAN GOLD		
Boulder Perseverance	8/10½	.....
Gold Mines of Kalgoorlie	15/3	+3d
Great Boulder Prop.	9/-	+3d
Lake View and Star	15/6	+3d
Mount Morgan	18/6	—3d
North Kalgurli	8/9	+1½d
Sons of Gwalia	5/9	+3d
Western Mining	14/-	—3d
MISCELLANEOUS GOLD		
Cam and Motor	8/10½	.....
Champion Reef	4/6	—1½d
Falcon Mines	8/6	—1½d
Globe & Phoenix	24/-	.....
G.F. Rhodesian	7/7½	.....
London & Rhodesian	5/-	.....
Motapa	1/9	.....
Mysore	5/1½	—1½d
Nundydroog	6/6	+1½d
Ooregum	3/1½	—1½d
St. John d'el Rey	15/6	+6d
Zams	40/-	—9d
DIAMONDS & PLATINUM		
Anglo American Inv.	7½	—⅛
Casts	28/6	—1/-
Cons. Diam. of S.W.A.	6½	.....
De Beers Defd. Bearer	6⅛	—⅛
De Beers Pfd. Bearer	17⅛	—¼
Pots Platinum	11/-	+6d
Watervaal	16/-	—1/-
COPPER		
Chartered	86/9	—9d
Esperanza	5/6	.....
Indian Copper	5/3	.....
Messina	4⅜	+⅛
Nchanga	10¼	+⅛
Rhod. Anglo-American	80/-	+6d
Rhod. Katanga	9/9	—2/1½
Rhodesian Selection	22/7½	.....
Rhokana	27⅛	—¼
Rio Tinto	37½	—¾
Roan Antelope	19/10½	+3d
Selection Trust	50/-	+3d
Tanks	5⅛	—⅛
Tharsis Sulphur Br.	4¼	+¼
TIN (Eastern)		
Ayer Hitam	26/-	+7½d
Gopeng	7/7½	—3d
Hongkong	7/1½	—1½d
Ipoh	17/6	+1/-
Kamunting	7/9	.....
Kepong Dredging	3/9	.....
Kinta Tin Mines	10/-	.....
Malayan Dredging	26/-	+3d
Pahang	10/6	+3d
Pengkalen	8/6	—1½d
Petaling	7/7½	.....
Rambutan	15/7½	+4½d
Siamese Tin	6/9	.....
Southern Kinta	19/3	+1/-
S. Malayan	23/9	+6d
S. Tronoh	8/10½	+4½d
Sungei Kinta	10/9	+3d
Tekka Taiping	4/10½	—3d
Tronoh	24/6	+9d
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	16/-	—9d
Beralt Tin	25/6	—1½d
Bisichi	7/-	+1½d
British Tin Inv.	16/1½	+1½d
Ex-Lands Nigeria	3/1½	—1½d
Geevor Tin	13/4½	+3d
Gold & Base Metal	3/1½	—1½d
Jantar Nigeria	9/4½	+1½d
Jos Tin Area	14/-	+6d
TIN (Nigerian and Miscellaneous) contd.		
Kaduna Prospectors	2/4½	—1½d
Kaduna Syndicate	2/4½	—1½d
London Tin	6/1½	.....
United Tin	3/1½	.....
SILVER, LEAD, ZINC		
Broken Hill South	53/9	+7½d
Burma Mines	2/3	.....
Consol. Zinc	38/3	+9d
Lake George	8/-	—7½d
Mount Isa	44/3	+1/-
New Broken Hill	31/-	+1/3
North Broken Hill	67/6	—1/-
Rhodesian Broken Hill	11/9	—1/3
San Francisco Mines	21/-	—6d
Uruwira	4/6	+1½d
MISCELLANEOUS BASE METALS & COAL		
Amal. Collieries of S.A.	48/9	+2/9
Associated Manganese	45/7½	+1½d
Cape Asbestos	24/1½	—1/3
C.P. Manganese	41/6	.....
Consol. Murchison	55/9	—7/6
Mashaba	2	—1
Natal Navigation	2⅛	.....
Rhod. Monteleo	1/3	.....
Turner & Newall	85/6	—9d
Wankie	15/3	+3d
Witbank Colliery	4¼	—¼
CANADIAN MINES		
Dome	$32½	+2
Hollinger	$31½	—¼
Hudson Bay Mining	$91½	+½
International Nickel	$87⅝	+1
Mining Corpn. of Canada	£5 1⅛	—1/16
Noranda	$137½	—½
Quemont	£7⅛	.....
Yukon	3/10½	+4½d
OIL		
Anglo-Iranian	16	+⅜
Apex	25/-	.....
Attock	45/7½	—7½d
Burmah	96/10½	+3/9
Canadian Eagle	35/4½	+1/10½
Mexican Eagle	20/1½	+4½d
Shell (bearer)	5⅛	.....
Trinidad Leasehold	25/6	—4½d
T.P.D.	26/3	+2/10½
Ultramar	27/7½	—3d

COMPANY NEWS AND VIEWS

Virginia Mine Officially Opened

Close on the heels of the recent official opening of the Harmony Gold Mine after its foundation four years ago, comes the news that it has now been joined by its easterly neighbour Virginia, shaft sinking at which started during October, 1949. The opening of this mine took place at an informal ceremony held at the property on September 23, and production will accordingly start virtually at the time forecast by the chairman. The company will start operations with a milling capacity of 75,000 tons monthly which will subsequently be increased to 125,000 tons. Some weeks will, however, elapse before the uranium plant reaches the production stage.

De Beers Again Pay 80 Per Cent Interim

The declaration of 80 per cent on the 5s. deferred shares of De Beers Consolidated Mines is no change from the interim dividend paid last year and the year before. The present level of diamond sales suggest that there is every likelihood of the final dividend also being held at the previous level of 120 per cent which would bring total distribution for the year ending December 31, 1954, to 200 per cent or the same as for the last three financial years.

De Beers Industrial Corporation, in which De Beers Consolidated holds over 71 per cent of the ordinary shares, has announced a dividend on the cumulative preference shares at the rate of 5½ per cent per annum for the six months ending September 30, 1954.

G.M.K.'s Share Issue and Interim

Gold Mines of Kalgoorlie (Aust.) are proposing to make a share issue to finance the recent purchase of South Kalgurli Consolidated and of Boulder Perseverence (see *M.J.*, August 27, page 244). Details of the offer, however, will not be released until the bid for Boulder Perseverence had either been accepted or rejected; the terms of the issue will also depend on how many shareholders elect to take cash in payment rather than shares in Gold Mines of Kalgoorlie (Aust.).

An interim dividend of 9d. (same) per 10s. share has also been declared by Gold Mines of Kalgoorlie (Aust.) on its issued capital of £A768,438 in stock units of 10s. and also on the shares to be issued to those shareholders of South Kalgurli who choose to accept shares instead of cash in exchange for their holdings.

S. Kinta—Dividend Increase and Capital Return

Southern Kinta Consolidated, in a preliminary profits statement in respect of the year ended March 31, 1954, has recommended a final dividend of 37½ per cent per 5s. share on its issued capital of £962,000. This compares with last year's final dividend of 25 per cent and brings the total distribution for the year to 70 per cent as against 50 per cent for the preceding period. The company also intends to recommend a return of capital of 1s. per share payable to shareholders in cash. On the conclusion of the necessary preliminary arrangements an extraordinary general meeting for this purpose will be convened and thereafter, application will be submitted to the Court for confirmation.

Profits for the year ended March 31 last, showed a substantial decline to £1,131,964 as compared with £1,737,476 previously. After appropriations, which included a much reduced tax liability of £576,000 (£1,055,000), the sum of £404,529 (£346,933) was available out of which dividends absorbed £370,370 (£258,537) leaving £367,851 (£333,692) to be carried forward.

A considerable increase in production has been reported by the company during the first five months of the current financial year and output improved to 2,048¾ tons tin ore compared with 1,652¼ in the previous corresponding period. Mr. J. I. Spens is chairman. Meeting, London, October 29.

Amalgamated Tin Earns Less—Pays More

A final dividend of 24 per cent has been recommended by Amalgamated Tin. This compares with 14 per cent previously and total distribution in thereby raised to 44 per cent against 30 per cent last year on an issued capital of £1,950,000 in shares of 5s. Preliminary profit figures show that profits fell to £1,462,506 against £1,732,163 in the preceding period but after all charges, dividends, etc., carry forward was increased to £267,202 as compared with £242,596 last year.

Kilo-Moto Mines in 1953

For some years past, the Societé des Mines D'or de Kilo-Moto have carried out intensive prospecting which has resulted in the recent discovery in the Watsa district of two gold deposits at Agarabo and Gorumbwa which on investigation confirmed the previously reported favourable indications.

The discovery of these deposits has led to the extension of the Durba works which have, moreover, been equipped with machinery enabling them to deal with the liquidation of refractory material. Production from these works which has already reached some 1.088 K. during 1953, is expected to reach 1.300 in 1954.

These developments by the Mines de Moto has led to the construction of a high tension cable of 70 kV. which will increase the supply of electric power to the Mines de Moto by connection with Centrale Budana 250 kV. district. The power installed at this centre is in process of being doubled by the installation of a third turbine of 7,000 h.p. The connecting line has just been put into operation—on August 15.

The work at Centrale Budana is calculated to be completed at the beginning of 1955. A new town is being built at Durba to house the European employees.

The Government of the Colony has decided to improve the aerial facilities. A new aerodrome is being laid out at Bunia some 50 km. from the Mines de Moto and as soon as this work is completed, probably about mid 1955, the construction of another airfield will be begun at Faradje, about 100 km. from the mines.

Miscellaneous Gold Returns—August

The level of gold production during August by British Guiana Consolidated gold dredging company was most satisfactory and not far below the high level reached during May this year when 2,128 oz. were recovered. In fact, the total for the month compares very favourably with high levels of the latter half of 1952 during which time the company worked ground described by the chairman, Mr. J. R. Robinson, as "exceptionally rich."

It is, therefore, of particular note that operations so far during the current financial year are running at a record cumulative level, and the higher grade of ground treated is well illustrated by the fall in total cubic yards dredged as compared with that of the previous comparable period.

Company	August, 1954		Months since year end	Current Financial Year Total to date		Last Financial Year Total to date	
	Tons (000)	Yield (oz.)		Tons (000)	Yield (oz.)	Tons (000)	Yield (oz.)
Br. Gu. Consol*	201·6	1,990	8	1563·7	13,813	1607·9	9,122
Clutha River* ..	95·0†	152†	5	1074·0	1,541	1090·0	2,699
Frontino	10·7	5,713	8	82·9	46,301	76·9	37,634
Kentan (Geita) ..	22·0	3,415	2	44·0	6,835	45·0	6,671
New Gu. G'fields	3·4	1,426	11	36·4	16,055	27·1	19,671
St. John d'el Rey‡	28·0	§£125,000	7	180·9	£821,649	202·5	£1,220,079

* Cu. yds. dredged.
† Dredge closed 12 days for repairs.
‡ July figures.
§ Estimated realizable value.

Oil Returns—August

Cumulative results in respect of the eleven months' operations by Apex Trinidad strongly suggest that production for the financial year to September 30 should exceed that of the last previous corresponding period by a small margin.

Company	August (in tons)	Months Since Year End	Cumulative Totals (in tons)	
			This year to date	Last year to date
Anglo Ecuadorian.....	27,225	5	135,538	130,836
Apex Trinidad	37,388	11	410,182	407,370
Kern Oilfields	26,411	3	79,924	84,535
Kuwait Oil*	4,089,294	7	26,043,445	24,241,930
Lobitos Oil.....	41,937	8	331,068	306,790
Trinidad Central.....	8,808	8	70,750	63,870
Trinidad Leaseholds.....	81,789	2	160,738	151,712
Trinidad Petroleum.....	41,499	1	41,499	40,011
Ultramar Oil†.....	110,145	8	857,300	842,790

Note—1 ton taken to equal seven barrels.
* July figures.
† Output figures are for S.A.P. Las Mercedes in which Ultramar holds a 50% interest.

NIGERIAN ELECTRICITY SUPPLY CORPORATION LTD.

The Twenty-fifth Annual General Meeting of the Nigerian Electricity Supply Corporation, Limited, was held on September 21 at 66 Queen Street, London, E.C.4.

Mr. George Hemmant, C.M.G., Chairman of the company, presided.

The following is an extract from the Chairman's circulated review:—

The number of units sold was 56,286,477, compared with 59,503,037 in the previous year, a reduction of 3,216,560 units. The relatively small reduction in the revenue from power sales was due to the fact that the present rather higher rates charged for power were introduced in April, 1952, and were thus in force for only 11 months of the previous year.

The reduction in the number of units sold was due largely to a prolonged 1952-53 dry season and its effect upon our reserves of water power in April and May of the year under review. The recent completion of the Jekko 2 power station will enable us to generate more power from the same water, or the same power from less water, and thus counteract the effects of a prolonged dry season.

The last essential component of the plant and machinery for the Jekko 2 power station was not delivered on the Plateau in Nigeria until February 2, 1954, and great credit is due to the Manager and his staff who brought the new station into service on the last day of that month. The station was officially opened on April 25 by the Resident of the Plateau Province, Mr. C. R. Niven, C.M.G., M.C., in the presence of a large company of leading members of the community on the Plateau.

The Jekko 2 power station, in addition to its value in enabling the corporation to meet present demands in the dry season, will also be a most useful asset as a general reserve of power, permitting the necessary overhaul of machinery throughout the system.

Considerable trouble was experienced during the year with the buckets of the pelton wheel at Jekko 1 power station and culminated in a temporary breakdown of the turbine in December. Repairs were quickly effected with the invaluable assistance of the General Manager of Amalgamated Tin Mines of Nigeria Limited to whom we are much indebted. A new solid wheel cast with its buckets, which had been ordered over a year before this breakdown, has now been installed, and future trouble with the buckets is not anticipated.

Power sales to our smaller consumers showed a general increase, and bulk sales to the Electricity Corporation of Nigeria now represent 10 per cent. of our total power sales.

Operational costs rose by £13,000 of which about £7,000 was due to heavier maintenance work and higher wages. The work of maintaining an extensive system of water conservation in a country subject to tropical storms of great violence must be expected to vary from year to year. Labour costs were increased by the introduction towards the end of the previous year of a higher cost of living allowance which has since been incorporated in basic wages.

An additional £15,000 has been provided for depreciation, and the appropriation of £20,000 for plant replacement reserve has been repeated. The usual dividend and bonus are recommended and the balance carried forward will be increased by £2,000.

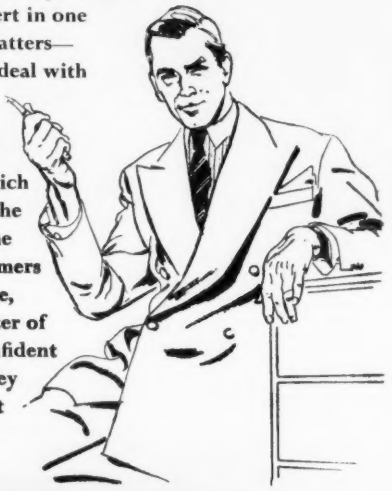
In the balance sheet there is an increase of £74,969 in fixed assets, due primarily to the construction of the Jekko 2 power station.

The report and accounts were adopted.

GAMBIAN MINERALS LIMITED (a subsidiary of British Titan Products Company Limited) urgently requires TWO JUNIOR GEOLOGISTS for work in Gambia. Applicants should be graduates in geology with two years field experience, capable of independent field exploration and alluvial prospecting; the work would be largely in the field with no accommodation for wives. Salary dependent upon qualifications and experience, but not less than £1,000 per annum. Free furnished accommodation; medical services; wife and children's allowances; 18 months tours followed by generous home leaves. Free first-class passages out and back each tour. Initial kit allowance of £50. Application forms may be obtained from the Personnel Manager, British Titan Products Company Limited, Kronos House, Coppergate, York.

OUT OF YOUR GROUND

There are so many occasions when one realises how difficult it is to be well-informed on all the financial problems which arise in these complicated days. That is why our organisation includes a number of departments which are each expert in one or other of these matters—departments which deal with Foreign Exchange, which understand the complexities of Wills and Trusts, which will not get lost in the labyrinths of Income Tax and so on. Customers may, in consequence, bring to us any matter of this kind, in the confident expectation that they will receive efficient attention and sound advice.



WESTMINSTER BANK LIMITED

ECONOMICS OF SOUTH AFRICAN GOLD MINING

A TEXT-BOOK FOR THE NON-TECHNICAL MINING INVESTOR

Published in Johannesburg, it is written by two accountants in collaboration with a geologist and a mining engineer, who explain how to make full use of the weath of geological, mining and statistical data put out by the mining companies.

Describes clearly with the aid of simple diagrams:—

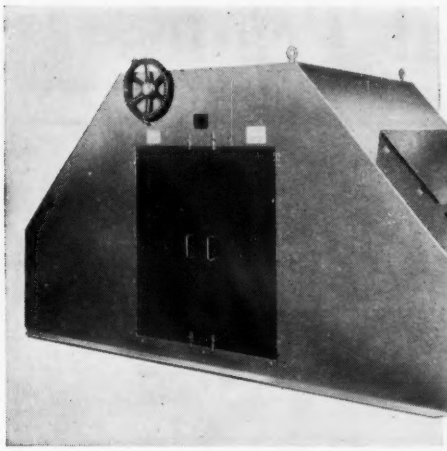
- **the geological systems of the Rand and O.F.S.**
- **modern prospecting, mining and ore treatment methods**
- **sampling, assaying and estimation of ore reserves**
- **compilation and interpretation of company reports and accounts**
- **Government lease payments and tax formulas**
- **the nature of gold shares and the factors affecting their value**

Copies obtainable from:

The Mining Journal

15 *WILSON STREET, MOORGATE, LONDON, E.C.2*

Price 42 shillings post free



CONCENTRATION OF MINERALS

by the

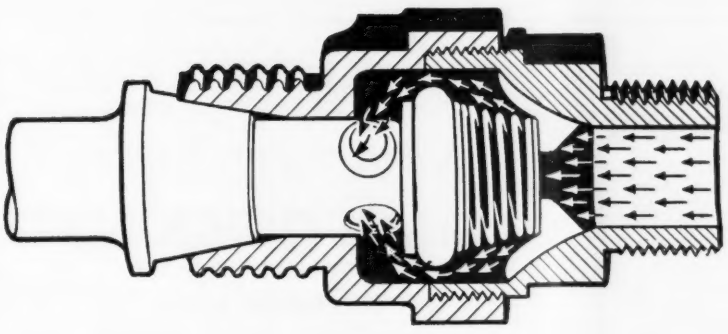
DAVIES *model 47* MAGNETIC SEPARATOR

Tungsten · Tin
Chromium
Noibium · Titanium
Base Metals
Rare Earths

Highest efficiency — Lowest Costs!

DAVIES MAGNET WORKS LIMITED
WARE · HERTFORDSHIRE · TELEPHONE WARE 489

D.P. AUTOMATIC VALVES



D.P. Automatic Valves are used in all cases where compressed air is supplied to pneumatic tools. Taking the place of air cocks (with all their advantages) they are entirely automatic in action and make leaks and air waste impossible. Besides the advantage of a general air saving with increased tool performance, *the air supply is automatically cut off immediately the tool is disconnected from the hose.* No struggling with refractory air cocks to shut off air supply—no projecting air cocks to suffer damage.
D.P. Automatic Valves are simple, robust and need no attention.

H.P./117—**Single Automatic Valve,** for use between air main and flexible hose or between flexible hose and pneumatic tool.

"D.P." (Cadmium coated) — **Single Automatic Valve,** similar to No. H.P./117, but of lighter construction. Used mainly for fitting between air hose and pneumatic tool.

H.P./116—**Double Automatic Valve,** for fitting between air main and flexible hose and to operate two pneumatic tools.

H.P./115—**Three-way Automatic Valve,** for fitting between air main and flexible hose, to operate three pneumatic tools.

dollery and palmer
LIMITED

54 VICTORIA STREET . LONDON . S.W.1 *Telephone:* VICtoria 2494

Cables: Deflection, Sowest, London

D.P.17

Metal and Mineral Trades

Established 1797 *Members of the London Metal Exchange*

DERBY & CO., LTD.

11-12 ST. SWITHIN'S LANE, E.C.4.

Telephone: MINCING LANE 5272

Specialists in

WOLFRAM, SCHEELITE, CHROME, MOLYBDENITE, TANTALITE, COLUMBITE
RUTILE, ILMENITE, BERYL, ZIRCON AND OTHER MINERALS

Smelters and Refiners of

GOLD, SILVER, PLATINUM, PALLADIUM, OSMIUM, IRIDIUM, ETC.

Buyers of

MINERALS, ORES, CONCENTRATES, SWEEPS, LEMELS AND RESIDUES
containing GOLD, SILVER, PLATINUM, COPPER, TIN, ZINC, LEAD

Smelting and Refining Works:
BRIMSDOWN, MIDDLESEX

Also at:
NEW YORK :: ADELAIDE
JOHANNESBURG
SALISBURY (Rhodesia)

LEONARD COHEN LTD.

GOLD, SILVER AND THE PLATINUM METALS
ORES, CONCENTRATES AND RESIDUES
METAL HARDENERS
NON-FERROUS METAL INGOTS

London Office:
1 HAY HILL, W.1
Telephone: GROSVENOR 6284

Works:
PORTH, GLAM
Telephone: PORTH 280

ROURA & FORGAS, LTD.

Telephone No: GERRARD 9641

Sole Sterling Area Suppliers of

ITALIAN QUICKSILVER

PRODUCED BY MONTE AMIATA, S.M.P.A.

COLQUHOUN HOUSE,
27/37 BROADWICK STREET, LONDON, W.1

EASTERN SMELTING CO. LTD.

CAPITAL—AUTHORISED £500,000: £435,000 ISSUED

Head Office: ST. SWITHIN'S HOUSE, 11/12 ST. SWITHIN'S LANE, LONDON, E.C.4

Telephone: MANsion House 2164/7 *Telegrams:* TIMAMASA, PHONE LONDON

TIN SMELTERS

BRANCHES THROUGHOUT THE FEDERATION OF MALAYA

Sole Selling Agents: VIVIAN, YOUNGER & BOND, LIMITED, PRINCES HOUSE, 95 GRESHAM STREET, LONDON, E.C.2

Telephone: MONARCH 7221/7
Telex: LONDON 8665

Telegrams: BOND, STOCK, LONDON
Cables: BOND, LONDON

we buy
CONCENTRATES
ORES RESIDUES
containing
Base and Precious
METALS

E. M. JACOB & CO. LTD.
Members of the London Metal Exchange
GREENWICH HOUSE, 10-13 NEWGATE ST.,
LONDON, E.C.1
Telephone: CITy 8401 (7 lines) *Cables:* JACOMETA, LONDON
Telex No: LONDON 8655

Smee's 352J

ROKKER & STANTON LTD.
DRAYTON HOUSE, GORDON STREET
LONDON, W.C.1
Metal Stockists & Shippers
for
BRASS, COPPER, ALUMINIUM
AND NICKEL SILVER
in
Sheets, Rods, Tubes, Strip, Wire, etc.
Associated Companies in Holland and Belgium also Regd. in South Africa and Rhodesia
Tel: EUS 4751/2 Cables: BENTLY 2nd; A.B.C.6
Grams: ROKKER, WESTCENT, LONDON

MINING & CHEMICAL PRODUCTS, LTD.
86, STRAND, W.C.2
Telephone: Temple Bar 6511/3 Works: ALPERTON
Telegrams: "MINCHEPRO, LONDON" WEMBLEY, MIDDLESEX
Buyers of Silver Ores and Concentrates
Smelters and Refiners of
BISMUTH
ORES, RESIDUES & METAL
Manufacturers of:
FUSIBLE ALLOYS, SOLDER, WHITE METALS, ANODES OF TIN, CADMIUM and ZINC IN ALL SHAPES
Importers and Distributors of:
ARSENIC . BISMUTH . CADMIUM
INDIUM . SELENIUM . TELLURIUM

PLATT METALS LTD.
METAL MANUFACTURERS and MERCHANTS
Buyers of
BRASS ROD SWARF AND SCRAP, and all descriptions of NON-FERROUS SCRAP METALS, BORINGS AND RESIDUES
Sellers of
BILLETS AND INGOTS TO ANY REQUIRED COMPOSITION, GRADED NON-FERROUS SCRAP METALS
METALEX WORKS, Great Cambridge Road, ENFIELD, Mddx.
Telephone: HOWard 3351 (5 lines) Telegrams: Walton, Enfield

THE STRAITS TRADING
COMPANY, LIMITED
Head Office:
P.O. Box 700, OCEAN BUILDING, SINGAPORE
Works:
SINGAPORE & PENANG
"The Straits Trading Co., Ltd."
Brand of Straits Tin

GEORGE T. HOLLOWAY Co. LTD.
Metallurgists & Assayers
ORE TESTING, WORKS AND METALLURGICAL RESEARCH LABORATORIES
Atlas Road, Victoria Road, Acton,
LONDON, N.W.10
Telephone: ELGAR 5202 *Grams and Cables:* NEOLITHIC LONDON

THE BRITISH TIN SMELTING
COMPANY, LIMITED
Works: LITHERLAND, LIVERPOOL
Smelters of Non-ferrous Residues and Scrap
London Agents:
W. E. MOULSDALE & CO., LTD.
2 Chantrey House, Eccleston Street, London, S.W.1
Cables: Wemoulanco, London Telephone: SLOane 7288/9

ZINC SHAVINGS
GRANULATED & POWDERED
NON-FERROUS METALS

"Lead Wool" for Pipe-jointing.
Metallic Packing for Pumps, etc.

THE LEAD WOOL CO., LTD.
SNODLAND KENT
Telephone: Snodland 84216 & 7 Telegrams: "Strength, Phone, Snodland"

MAYBANK METALS LTD.

This Company backed with the vast experience gained in a 100 YEARS of progressive trading, will expedite all orders . . .

THE BUYING OF MIXED OR SORTED NON-FERROUS SCRAP METALS and Supplying of Finely Graded Non-Ferrous Scrap to Your Requirements.

MAYBANK METALS LTD.
DEPTFORD WHARF, GREENWICH HIGH ROAD, LONDON, S.E.10. Telephone: TIDeway 5351 (10 lines)

H. BARNETT LTD.
VICTOR ROAD, LONDON, N.7.
IMPORT : EXPORT
Phone: ARCHWAY 5461 (5 lines) Established 1865
WE SPECIALISE IN ALL NON-FERROUS SCRAP AND INGOT METALS

CUPELS
MAGNESIA CUPELS and ASSAY MATERIAL "MABOR" BRAND, as supplied to MINTS, MINES and ASSAYERS throughout the World.
MABOR (1944) LIMITED
(Founded 1900)
THE PIONEERS OF MAGNESIA CUPELS
Registered Office: 310 Winchester House, London, E.C.2
Phone: London Wall 5089 *Tel. Address*: Maborlim, London
Agencies: SALEM, INDIA: MONTREAL, CANADA: PERTH, W.A.
Supplies through Agents, the Trade, or direct.

TINPLATES - BLACKPLATES
Strips, Circles, Printers' Waste
EXPORT & HOME MARKET
Prompt attention to all enquiries
BAYSWATER METAL SUPPLY CO.
8, LADBROKE WALK,
LONDON, W.11. ENGLAND
Phone: BAY 7541 Cables: ALMETSUP, LONDON

International Smelters and Buyers of
NON-FERROUS SCRAP METALS AND RESIDUES
TIN
LEAD
WHITEMETAL
SOLDER
GUNMETAL
COPPER
THE EYRE SMELTING CO LTD
Tandem Works, Merton Abbey, London, S.W.19
Phone: Mitcham 2031 Wire: Eyrsmeltin, Phone London

EVERITT & Co. LTD.
40 CHAPEL STREET
LIVERPOOL
Teleg. Address: Persistent, Liverpool Phone: 2995 Central
SPECIALITY
MANGANESE PEROXIDE ORES,
We are buyers of:—
WOLFRAM, SCHEELITE, MOLYBDENITE
VANADIUM, ILMENITE, RUTILE,
ZIRCONIUM and TANTALITE ORES
Suppliers of:—
FERRO-ALLOYS & METALS NON-FERROUS ALLOYS

CHARLES KERRIDGE
● SCRAP LEAD ● BATTERY PLATES
● COPPER CABLES ● NON-FERROUS CONTENTS
FENCEPIECE ROAD, CHIGWELL, ESSEX
Telephones: Hainault 2903, Larkswood 3863 *Telegrams:* Metallia East Phone London

"*Tropag*"
ASBEST-& ERZIMPORT OSCAR H. RITTER K. G.
Hamburg :—: Ballindamm 7
ASBESTOS - ORES - MINERALS
Import Export Transit

ENTORES, LIMITED
KINGS HOUSE, 36 & 37 KING STREET,
LONDON, E.C.2
NON-FERROUS METALS
ORES · RESIDUES
Telegrams: Entores, Phone, London *Telephone:* MONarch 3415 *Telex No:* London 2489

DANIEL C.
GRIFFITH
& CO.
ASSAYERS
TO THE BANK OF ENGLAND
27/33, PAUL STREET,
LONDON, E.C.2.

Branch Office: LEFKA, Cyprus

Also at:
BRISTOL
BIRMINGHAM
GLASGOW
HULL
LIVERPOOL
NEWCASTLE
S. WALES

Analytical Chemists, Samplers, Technical representatives in sales of Ores & Metals at all Ports and Works.

Analyses of
PRECIOUS METALS
BASE METALS
ORES & RESIDUES
Etc.

Also in:
BELGIUM
CANADA
FRANCE
GERMANY
HOLLAND
ITALY
PORTUGAL
SPAIN
SWEDEN
SWITZERLAND
U.S.A.

Telephone: MONARCH 1314 (3 lines)
Telegraphic Address: "GRYFFYDD, LONDON."

HARRIS PLASTICS (RICHMOND) LTD.
FOR ALL SCRAP METALS
Specialities:—
NICKEL MOLYBDENUM TUNGSTEN
MANOR PARK, RICHMOND, SURREY *Phone : 0028*

HENEAGE METALS
for Quality Ingots IN BRASS, GUN METAL & PHOSPHOR BRONZE.
PHONE ASTON CROSS 1177/8
HENEAGE METALS LTD. HENEAGE ST. BIRMINGHAM.

DEERING PRODUCTS LTD.
8 GREAT SMITH STREET, LONDON, S.W.1
ORES - MINERALS - REFRACTORY RAW MATERIALS
Telephone : ABBEY 2681/2 Cables : PRODEERING, LONDON

JCG
★ MINERALS
★ METALS
★ ORES
of every description
J.C. Gilbert LTD
COLUMBIA HOUSE, ALDWYCH, LONDON, W.C.2.
AGENTS IN MOST COUNTRIES THROUGHOUT THE WORLD

Contractors for Ores · Concentrates & Residues
containing
LEAD
ZINC · COPPER · ANTIMONY · WOLFRAM
LEOPOLD LAZARUS LTD.
CREECHURCH HOUSE, LONDON, E.C.3
Telephone: AVENUE 5341 Cables: ORMINLAZ, LONDON
OFFICES AT SYDNEY, CALCUTTA AND JOHANNESBURG

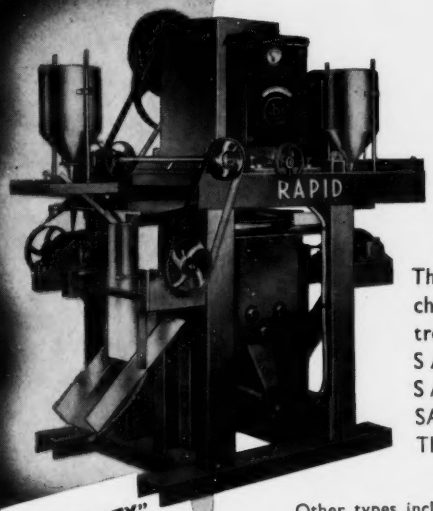
S. B. LUNZER & CO. LTD.
NON-FERROUS SCRAP METALS
INGOTS, ORES AND RESIDUES
Offices:
WESTMINSTER BANK CHAMBERS,
LONDON BRIDGE, S.E.1
Telephone: HOP 1071/2 Cables: LUNZMETAL, LONDON

We are Buyers of . . .
Monazite . Beryl Ore
Lithium Ores . Tantalite
Selenium Containing Materials
Please send your detailed offers to:-
NEW METALS & CHEMICALS Ltd.,
16 NORTHUMBERLAND AVENUE,
LONDON, W.C.2.
Telephone: WHItehall 0573 (5 lines) *Cables:* "Newmet London"
International Telex: London 8016
Warehouses at:
CRAVEN HOUSE, CRAVEN STREET, W.C.2 *and*
LONDON BRIDGE STREET, S.E.1

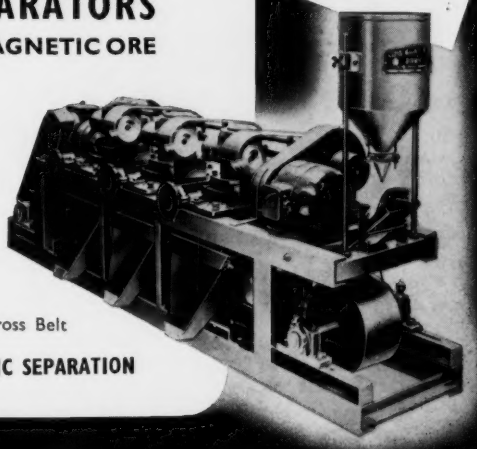
RAPID

Electro-Magnetic ORE SEPARATORS

For FEEBLY MAGNETIC ORE



"RAPID O.G." Super Selective separation of one, two, or upto six magnetic minerals, from the bulk in one passing



These proved machines successfully treat MONAZITE SANDS, TIN SANDS, IRON SANDS, WOLFRAM TIN, CORUNDUM, etc.

Other types include Induced Roll and Cross Belt

"RAPIDITY" High speed separation and extraction of one magnetic mineral

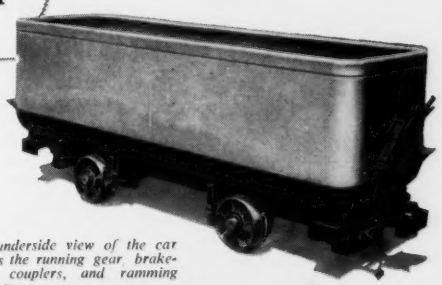
THE RECOGNISED AUTHORITY ON MAGNETIC SEPARATION

RAPID MAGNETIC MACHINES LIMITED

LOMBARD STREET, BIRMINGHAM, 12 Tel: VIC. 1137. 'Grams: "Magnetism, B'ham."

BUTTERLEY

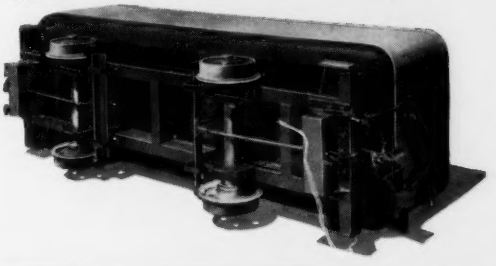
3 ton mine car



In this Butterley 129 cu. ft. all-welded mine car the body is 11 ft. 3 in. long x 3 ft. 9 in. wide x 3 ft. 2 in. deep. The mine car measures 12 ft. 4½ in. long over the couplers and stands 4 ft. 6 in. high from the rails.

It is fitted with automatic E.S.C. "Willison" couplers and is equipped with parking brakes. This is but one of the many varieties of mine cars and pit tubs produced by the Butterley Company in robust and enduring construction to a high standard of quality.

This underside view of the car reveals the running gear, brakework, couplers, and ramming brackets.



The famous Butterley "Top Capping," which is pressed integrally with the body plates, forming an extremely stout stiffener.

THE BUTTERLEY COMPANY LIMITED
RIPLEY · DERBY · ENGLAND
Telephone: RIPLEY 411 (9 lines)
London Office: 20 ASHLEY PLACE · VICTORIA, S.W.1.
Telephone: VICTORIA 8023/4/5

FOUNDED 1790

PT.51a

Published by The Mining Journal Ltd., 15 Wilson Street, Moorgate, London, E.C.2, and printed by Washburn & Sons Ltd., 25-27 Queens Road, Southend-on-Sea, Essex. Registered as a Newspaper.